A CHILTON PUBLICATION

the Iron Age

NATIONAL METALWORKING WEEKLY

September 4, 1952

NTS PAGE 2

SEP 4 1952
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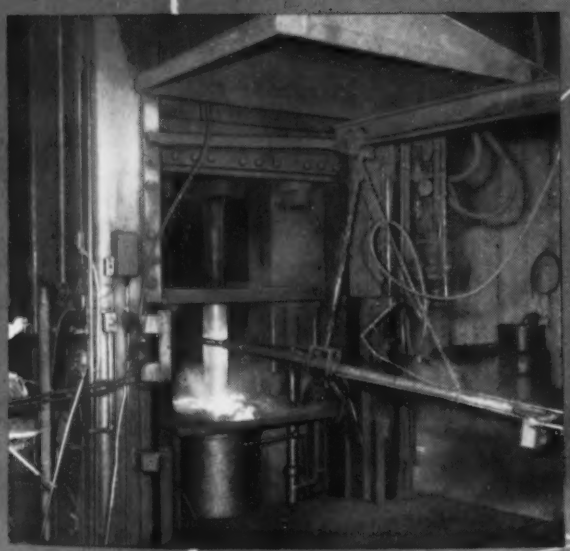
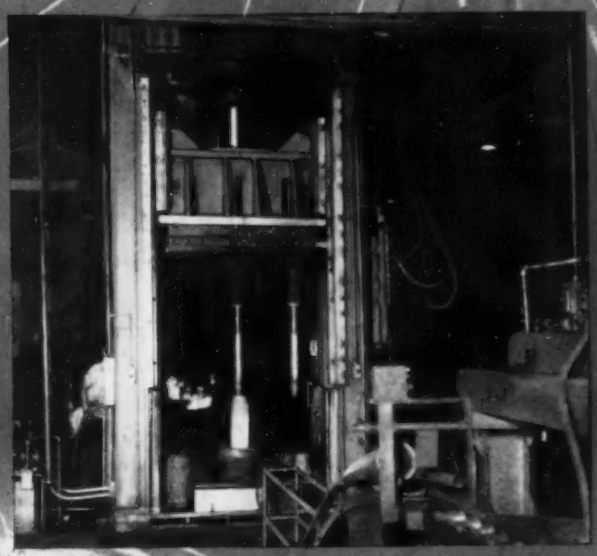
MASS PRODUCTION of projectiles with

TRADE Verson MARK

PRESSES AND TOOLING
for greater production and lower costs!



Piercing a steel billet in a 600 ton Verson hydraulic press.



Here a Verson hydraulic push through press sizes the cavity and O.D. of the steel forging.

A Verson Press for every job from 60 tons up.

TRADE Verson MARK

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

ALLSTEEL PRESS COMPANY

9314 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • SO. LAMAR AT LEDBETTER DRIVE, DALLAS, TEXAS

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • WHEELON DIRECT ACTING HYDRAULIC PRESSES

Farval saves time in lubrication of Electroweld Tube Mills

FORMING steel tubing at high non-stop speed was a prime consideration to the builder of this electroweld tube mill. Slow, old-fashioned hand oiling just couldn't lubricate 44 main bearings properly and still keep step with accelerated production schedules.

No wonder this manufacturer installs Farval Centralized Lubrication Systems on his fast-moving continuous mills! Farval lubricates *while the mills are in full operation,* entirely eliminating downtime for oiling and protecting the costly bearings which help keep exactly to specification the 15,000 feet of tubing put out each 8 hours.

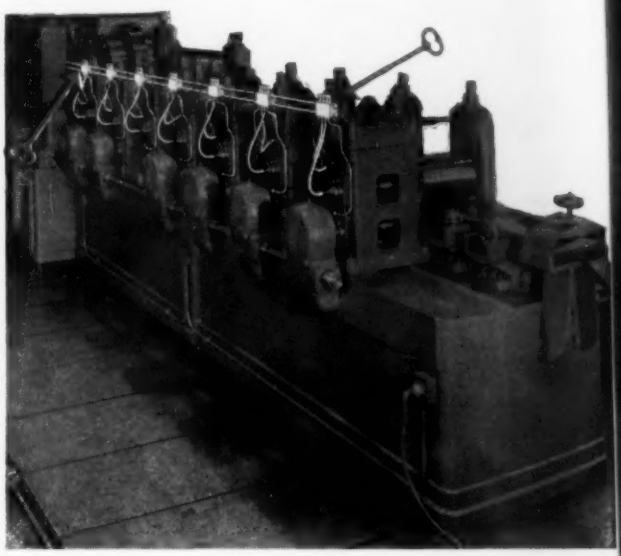
Today Farval systems safeguard millions of bearings in steel and metal working plants—on sheet and plate mills, tube and pipe mills, blooming mills—in fact, every type of equipment that must be lubricated regularly and adequately, to keep bearings on the job no matter how hard to get at.

Farval—proved in 25 years' service—is the original Dualine system of centralized lubrication that delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, as often as desired. The Farval valve has only two moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Indicators at every bearing show that each valve has functioned.

For a full description of time-saving Farval, write now for Bulletin 25. The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

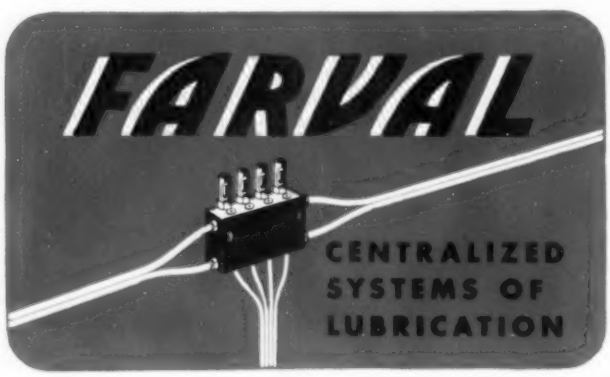
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

FARVAL—*Studies in Centralized Lubrication* No. 127



KEYS TO ADEQUATE LUBRICATION—*Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping stations—you know that a machine will be properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.*

Photo by courtesy of American Electric Fusion Corporation, builder of this tube mill.



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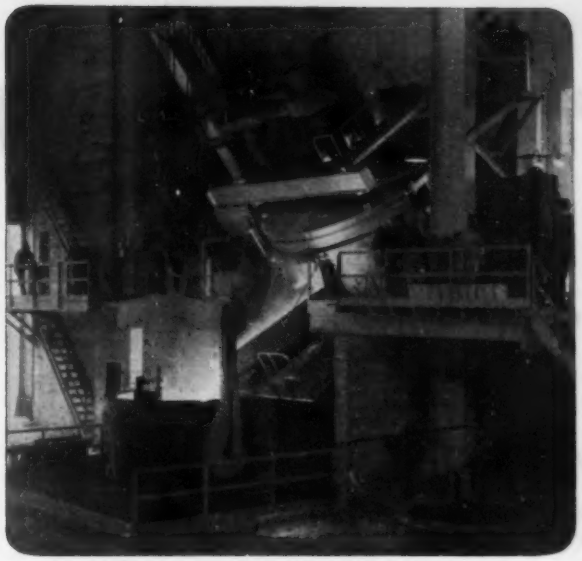
Electric Furnace Bearing Steel



Internally Clean... Accurately Rated

Getting rid of non-metallic inclusions is probably the toughest job that confronts any manufacturer of high-grade bearing steels. At Bethlehem we are able to hold inclusions to the minimum by using modern melting methods combined with rigid metallurgical control. And we test every heat at the critical stages of production. As a result of this painstaking care, Bethlehem bearing steels can meet the stringent requirements of the anti-friction bearing industry.

But just as important as our ability to turn out sound steel is our ability to rate or evaluate every heat according to the customers' standards. These standards often vary according to the sizes and bearing components to be manufactured.

Preliminary tests for inclusion ratings are taken by our mill technicians as soon as the billets are rolled. The extent and coverage of this examination is governed by the end use of the finished bearing.

Obviously, any final inspection rating which will be comparative can be realized only where there is a complete understanding between our metallurgists and the customer. Whether you use the 52100 types or low-carbon alloy carburized grades, we will be glad to give you further information on methods of rating, as well as analyses and properties.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

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The Iron Age—DIGEST

Vol. 170, No. 9

September 4, 1952

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NEWS DEVELOPMENTS

GEARS FOR ELECTRONICS MUST BE PRECISE—P. 92
Precision electronics equipment involved in split-second tasks of computing range of missiles or planes flying at super-sonic speeds must have precision gears. Arma Corp. has a slogan of precision in making its own gears. It works on the premise that precision must be built into a gear in initial stages.

AUTO OUTPUT DECONTROL HOPES RISE AGAIN—P. 106
Removal of copper and aluminum from the critical list revives talk of freeing automobile production from government restrictions. No action on this would be possible until the material gap caused by the steel strike has been filled. The industry believes it would have happened before except for the strike.

1952 AUTOS—MAIN STRESS IS ON STYLING—P. 106
Tool troubles have killed some new engine programs so manufacturers have put emphasis on styling. Also some of the major producers have been long overdue for a face lifting job. Engine trend is to V-8 model and wide use of interchangeable bodies is featured.

WASHINGTON SAYS NO INFLATION'S IN SIGHT—P. 111
Capitol economists are driving home the idea that another round of inflation is not likely. The government estimates the average city family is spending less than a year or so ago. Industry may see tempo of the military draft quicken. Deferred men may be caught as the Army is forced to discharge men.

HUNT NEW IRON ORE SOURCES IN CANADA—P. 119
American steel interests are paying more and more attention to Canada in their search for new iron ore deposits. Exploration is not being confined to remote districts, but is also carried on in fairly well-populated areas in the eastern provinces. U. S. capital will finance much of the development, as it did before.

MUNITIONS BOARD REVIEWS STOCKPILE NEEDS—P. 113
Items currently on the strategic list are being reconsidered by the Pentagon's Munitions Board to determine how much of which ones should go in the national stockpile. Substitute materials are taking pressure off some items, but additional studies must be made before other substitutes can be approved.

of the WEEK in metalworking

ENGINEERING & PRODUCTION

AUSTENITIC CAST ALLOYS AT LOW TEMP.—P. 147
Design engineers of new low temperature processes are turning to austenitic Cr-Ni cast alloys where toughness and corrosion resistance is needed. Degree of toughness from room temperature to —432°F for the various alloys can differ widely. Care should be taken in selection and treatment of alloys.

HOT CUPPING, COLD DRAWING V. MACHINING—P. 152
Savings in critical alloy steel and elimination of costly machining resulted from the use of hot cupping and cold drawing to make 81 mm shells at Rheem Mfg. Co. Billets are induction heated at 2000°F and hot forged in a 600-ton Ajax forging press. Only nose and tail machining are required.

RADIOACTIVE TOOLS PERMIT FAST STUDIES—P. 154
To speed up machinability studies and other tests depending on measurement of tool wear, measure the rate of wear over a short time, not total wear. This can't be done by conventional measuring of tool flank wear. It can be done by new methods using radioactive tools. Tests can be made faster.

NEW SMALL MILL ROLLS STRIP 0.0002 IN.—P. 156
Demand for very thin metal strip has given rise to a new and unique rolling mill. Armzen Co. has engineered a new small Sendzimir mill which will cold roll electrical alloys to 0.0002 in. Smaller work rolls eliminate the need for intermediate anneals. Work rolls can be changed in 1 min.

SHAKE THOSE BULK UNLOADING PROBLEMS—P. 160
If improperly unloaded, hopper car shipments of bulk materials can be costly. Just to install a car shaker is not enough as various materials flow differently. Gravity will only unload a car until the angle between the horizontal and top surface of the material equals the angle of the slide.

NEXT WEEK—HOW GOOD IS CHARPY IMPACT TEST?
To determine reliability of the Charpy test, one strength level of steels of uniform microstructure was tested. Steels of 150,000 to 160,000 psi yield strength, having impact strength of 20 to 30 ft-lb when tested at —40°F produce a variation of 1.8 or 3.5 ft-lb. Within these limits Charpy test is reliable.

MARKETS & PRICES

WILL STEEL TROUBLES VANISH IN EARLY 1953?—P. 89
The Ides of March in '53 may be the turning point to much easier steel supply, believe steel men, government planners. Uncertainties over what levels plants want to build inventories clouds an otherwise positive picture. During strike, inventories dropped from 18 million tons to 8 million tons.

OPTIMISM GROWS ON CONSTRUCTION STEEL—P. 92
Washington is belatedly recognizing the improvement in supplies of steel for construction purposes. Defense agencies are hinting broadly about a change in controls orders within 60 days. It would increase amounts of controlled materials which may be self-authorized, and permit recreational starts.

WEST GERMANY LOOKS TO BELGIUM FOR STEEL—P. 95
Belgian exports of semi-finished steel to West Germany during the year are expected to amount to around 1.2 million tons. Increase in demand is not due to slackened German steel production but results from increased business activity and higher exports. European steel market fairly firm, importer says.

WHAT'S MISSING ON COST PASS-THROUGH?—P. 101
OPS allows industry to pass along higher costs of steel, copper, aluminum. Higher wages, freight rates must still be absorbed by some groaning manufacturers. Whether OPS will allow these added cost factors is yet in doubt. But almost 4000 applications are in OPS hands asking for this kind of relief.

TOOL BUILDERS UNHAPPY AT PASS-THROUGH—P. 116
Machine tool makers are not exactly kicking their heels with joy over the new order permitting handing along of higher metal costs. The industry would like to see price relief on some other important costs—such as labor and transportation. Meanwhile Washington issued another frustrating regulation.

COPPER, ALUMINUM HIT DPA'S EASIER LIST—P. 184
DPA now calls copper, aluminum, magnesium in approximate balance with defense and essential civilian demand. Put aluminum loss due to steel strike at 55,000 tons. See complete easing in light metal by January 54. Magnesium shipments off during June, well above last year. Alcoa after auto trim market.

Only B. F. Goodrich makes the grommet belts that cut costs 20 to 50%!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

"... within a few days ordinary belts had stretched ... After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all ..."

"Ordinary belts lasted only 5 or 6 weeks ... B. F. Goodrich grommet belts are in their sixth month of service ..."

"Previous belts suffered from shock loads, wore out fast ... BFG grommet belts have been in service 2 years with no shut-downs..."

There are hundreds of cases like these.

They cost no more

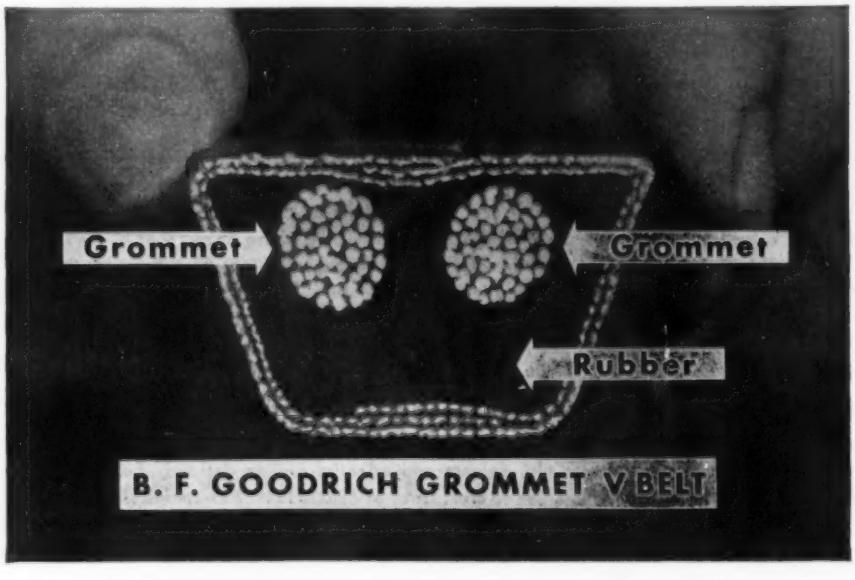
BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V-Belts BY

B.F.Goodrich

FIRST IN RUBBER



The B. F. Goodrich Company
Dept. IA-9
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

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Indexed in the Industrial Arts Index and the Engineering Index.

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More About Taxes

LAST week we wrote about taxes—"till death us do part." Millions of people who never gave it a second thought are becoming tax conscious. That is a good omen. It is especially good when the present administration is tax slap-happy.

By and large people are not against taxes in themselves. Anyone with an ounce of brains knows that conditions today are far different than they were 20 years ago.

They know too that with our increase in population, our ideas about helping the aged and helpless will mean a bigger load for those who can pay. People know instinctively that with more cars we need more roads, turnpikes and bridges.

Industrialists and housewives know too that we will not always be a "have" nation—we are already a "have not" on many things. They know we must have conservation measures which cost money. They know too that agriculture often needs government help to combat floods and erosion. These people know we must find ways to increase farm output; individuals are eating more and our population is rising rapidly.

The worker, his wife and management know quite a lot about what we need and what we don't need. The heavy increase in taxes is bringing it home to those who were not already aware of it. But there is one big gripe with all of us a gripe that is bigger than taxes alone.

The justified moaning about taxes is based on the utter abandon with which our government tosses around the millions and billions. It isn't the money itself that burns us up. It is the horrible and needless waste of money which has been collected from the taxpayers. No sane way has been evolved for spending this money wisely where it will do the most good.

We are wasting billions in the defense program and in the armed services. We have government payrolls which could not stand the light of a real investigation. We have government services that are nothing but an extension of department heads' egos. We have a spoils system that rewards ward heelers at the expense of the taxpayer.

That's what burns us up. The goose will not stand still forever and lay the golden (gold plated now) egg.

Tom Campbell

Editor

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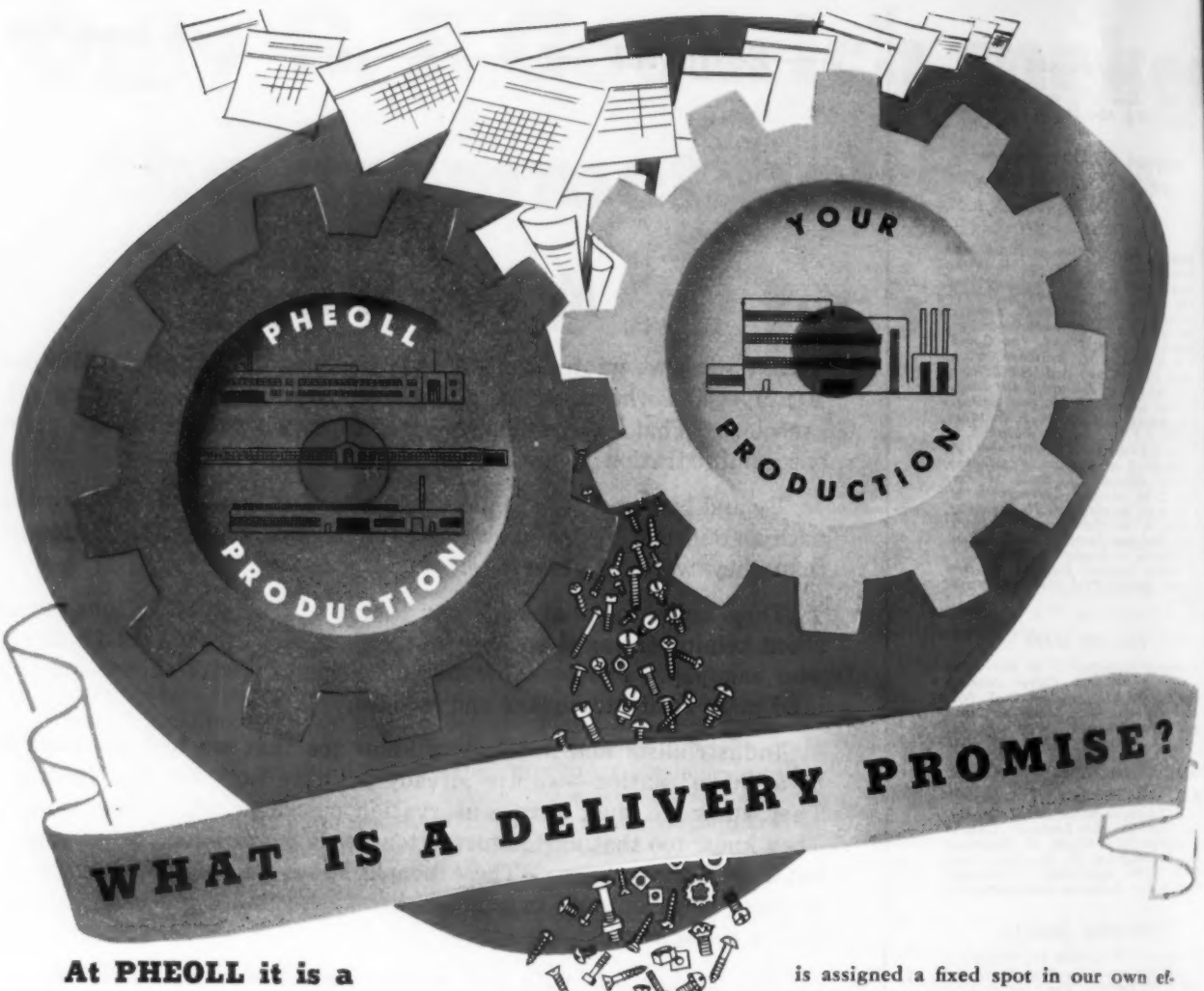


WHAT IS A DELIVERY PROMISE?

At PHEOLL it is a determination to earn and hold your TRUST

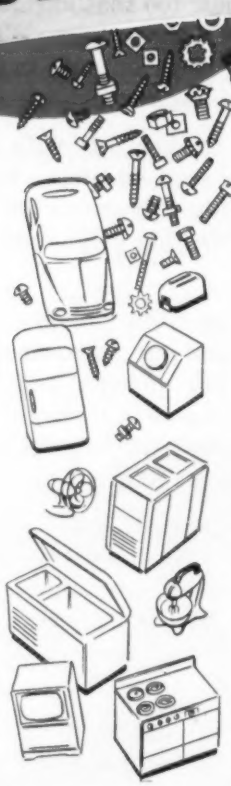
Your order for screw products . . . your delivery requirements . . . *set the pace* at Pheoll Manufacturing Company.

We recognize that your fastener orders have been planned to meet definite production schedules. We know that "down time" is costly. That's why Pheoll exerts every effort to deliver *the products you have ordered, as you have ordered them, and at the time specified.*

But going much further, a Pheoll delivery promise is a carefully-considered pledge, based on definite factors. Once you have been given a promise, your order is assigned a fixed spot in our own efficient schedule. *No other order, regardless of size, can displace it.* And both production-wise and method-wise, Pheoll is set up to complete your order AS PROMISED.

We produce billons of pieces annually . . . over 10,000 separate items . . . scheduled against a thousand first and second operation machines. That's really a complex problem! But Pheoll has developed systems for production scheduling and order control which we firmly believe to surpass those of any other screw producer . . . and Pheoll is one of the largest.

If, in your own operation, maintained schedules and assured delivery of components are imperative, may we send you our booklet entitled, *"Pioneering in Customer Service?"* It shows why you can rely on Pheoll as a dependable source of supply for all types of threaded fasteners.



PHEOLL

MANUFACTURING COMPANY
5700 Roosevelt Road, Chicago 50, Ill.

SCREWS
BOLTS
NUTS

Dear Editor:

Letters from readers

More To It

Sir:

Concerning your statement about Lincoln Motor Co. being purchased in 1922 by Henry Ford (Aug. 14 issue, p. 103), "one story" and "a more probable reason" why Ford bought Lincoln Motor Co.; we recall that the late Henry M. Leland, founder of Lincoln, was facing financial failure when his old friend Henry Ford bought the company. Mr. Leland we faintly recall was chief engineer of Cadillac before Lincoln.

E. L. SCHWATT
Industry Engineer
Brown Instruments Co.
Philadelphia

Electrostatic Painting

Sir:

In reference to the article in your Aug 7 issue on electrostatic painting, a Ransburg unit was mentioned for application of paint to metallic surfaces.

I would appreciate it very much if you could furnish me with some more information concerning this process.

C. FRANDSEN
Maintenance Supervisor
Sprague Meter Co.
Bridgeport, Conn.

For more details on the Ransburg No. 2 Electrostatic Process write to the Ransburg Electro-Coating Corp., Barth & Sanders Sts., Indianapolis 7, Ind.—Ed.

Plant Safety

Sir:

We would like to have permission to print part or all of your article "Safety: How About Your Plant?" (May 8, p. 76) in our house organ. We will be glad to give proper credit for any part of the article that we may use.

A. D. GALLOWAY
Safety Director
Union Wire Rope Corp.
Kansas City

Titanium Scrap

Sir:

Please advise me if you are informed of any mill or smelters that will use titanium in sheet, tubing or turnings.

W. E. MASON, JR.
Kroot & Son Co., Inc.
Indianapolis

Some titanium manufacturers are using clear sheet trimmings and turnings in their melting processes but the cleanliness and size requirement are very rigid. Only other outlook for scrap titanium today is to the steel mills who use this material to replace ferrotitanium in making steel grades like stainless type 321.—Ed.

Longer Life

Sir:

We refer to the following items which appeared on p. 55 of your Aug. 21 issue: cutting tool life has been upped 150 pct and more by wet pressure blasting with suitable abrasives; and among fascinating possibilities for a new ceramic fiber recently announced is use in filters.

Please advise where we may obtain further data on the above.

S. J. GWOOSH
President
Excel Automatic Products, Inc.
Newark, N. J.

For more information on increasing cutting tool life write to Cro-Plate Co., Hartford, Conn. Refractories Div., Carborundum Co., Niagara Falls, N. Y., can give you more details on the new ceramic fiber.—Ed.

Forming Titanium

Sir:

I read with great interest the article "Titanium Sheetmetal Parts Successfully Made," appearing in your July 17 issue. I would appreciate receiving two additional copies of this article.

J. A. ROLAND
Asst. to the President
Christiansen Corp.
Chicago

Polishing Compound

Sir:

Recently you published an article dealing with a new silica base polishing compound used to polish aircraft sheets of Alclad.

We would welcome any additional information that you could give us on the above subject.

P. A. GOBEIL
Plant Metallurgist
Aluminum Rolling Mills, Ltd.
Cap de la Madeleine, Quebec

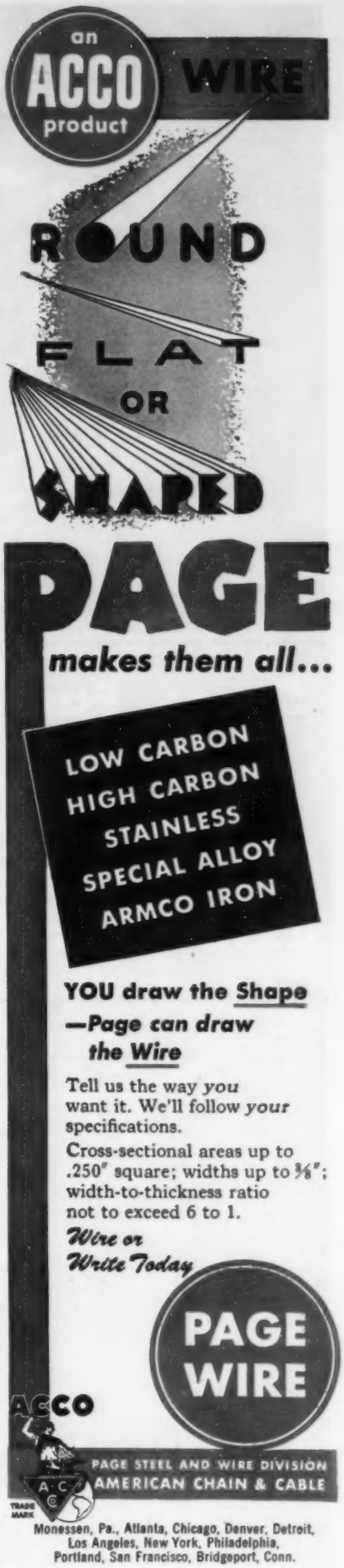
Write to Ryan Aeronautical Co., San Diego, Calif., for additional information on this new polish.—Ed.

Melt Shop

Sir:

We would appreciate receiving five tear sheets of the article "Forge Shop Installs Compact Steel Melting Plant" by D. I. Brown which appeared in your June 12 issue.

P. H. DALEY
General Manager
Heppenstall Co.
Eddystone, Pa.



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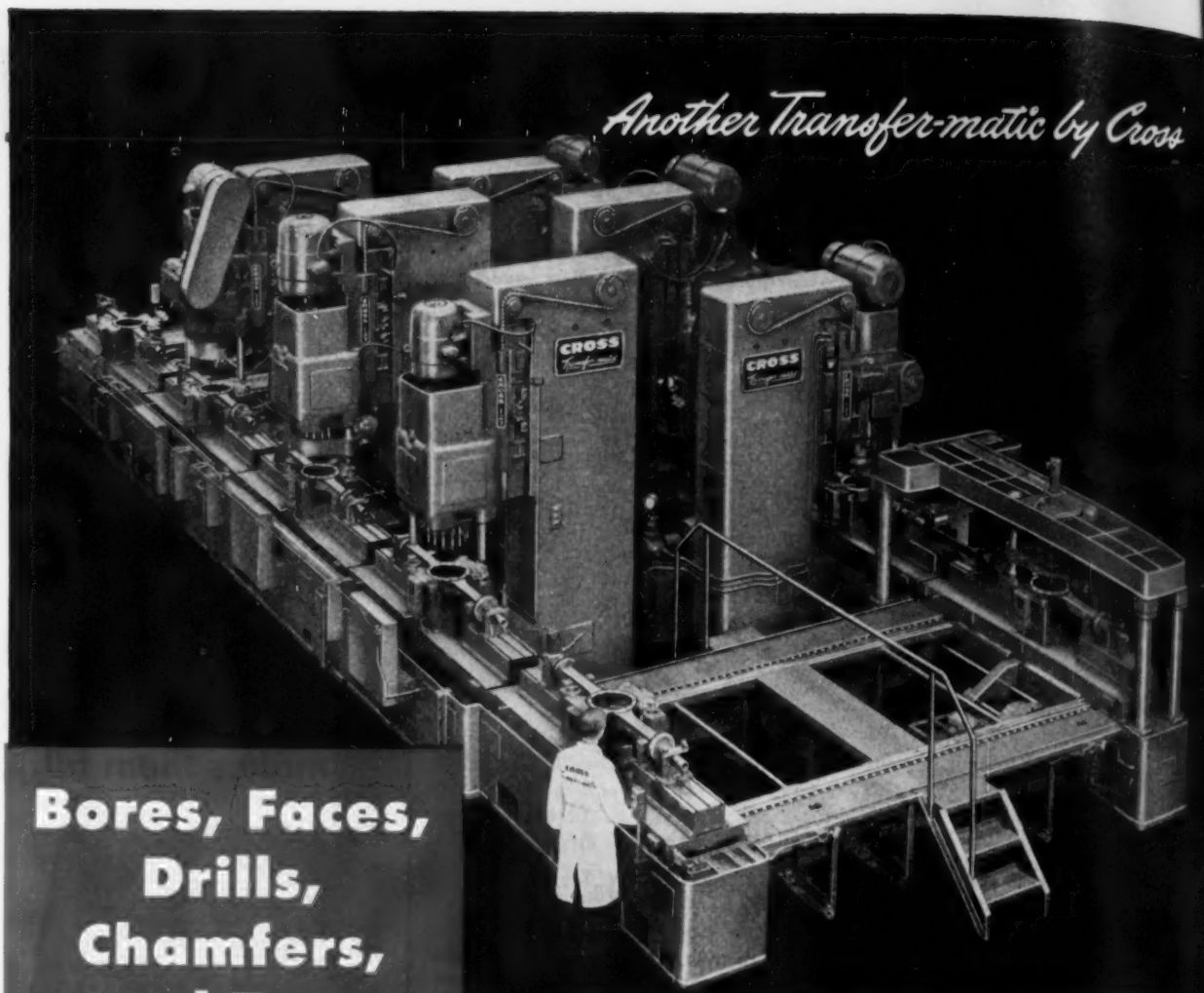
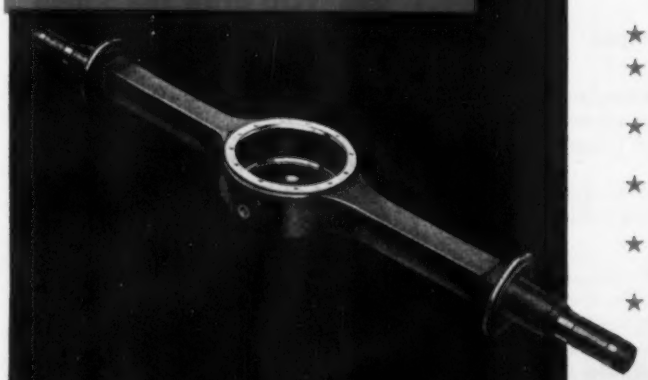
Another Transfer-matic by Cross



Bores, Faces, Drills, Chamfers, and Taps Axle Housings



- ★ Rough and finish bores banjo hole; rough and finish faces banjo face; drills and chamfers holes in banjo face; drills, spot-faces and taps drain hole.
- ★ 35 pieces per hour at 100% efficiency.
- ★ Capacity for housings from two and one-half to five tons.
- ★ Eight stations—one for loading, one for targeting, six for machining.
- ★ Palletized work holding fixtures hold part securely during all operations.
- ★ Phonograph record finish for the banjo face.
- ★ J.I.C. standard electrical and hydraulic construction with stranded wires.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

Fatigue Cracks

by Charles T. Post

Fair Exchange

Your f.f.j.'s non-ferrous specialist, Bob Hatschek, returned from his inspection of Aluminum Co. of Canada's new installations at Arvida, Quebec, with a significant comment on the foreign exchange situation.

For all these years Canadian visitors to the U. S. have endured good-naturedly the inconvenience of paying a premium on their currency. Now that the Canadian dollar has forged ahead of the U. S. dollar, with equal good nature they are not letting the Americans forget the turn-about.

After a round of golf at Arvida, Bob and the members of his party each tipped the caddies the usual dollar. All but one golfer tipped in Canadian currency. This man slipped his boy an American dollar. The boy took it, looked at it, and immediately demanded an extra nickel to even things up.

Bob didn't blame the caddy too much. The character of golfing skill that day, he says, was summed up by an overheard caddy comment, as one of the Americans sliced 50 yards into the rough: "Quel bum!"

A Rose By Any Other . . . ?

What would you, loyal reader, do if you slipped your favorite family journal out of its envelope some week to find that the name had been changed from "The Iron Age" to "New Metal Age"?

There's no use denying that this question has been batted around speculatively by staff members, readers, and advertisers.

A Pittsburgh advertising man has just raised the question in connection with the forthcoming October 9 Metal Show Issue. He points out that the issue will be built around a 24-page report on nine metals whose importance has risen spectacularly: cerium, germanium, lithium, molybdenum, selenium, silicon, titanium, vanadium and zirconium. Metalworking men using these metals will be learning about them in THE IRON AGE, but they certainly will not be living in an age of iron as much as before.

"To change the name of any publication or institution," the advertising man writes, "always involves some loss, and particularly when so honorable and expressive a name, rich in connotations, has been in use as long as yours. But a more serious and continuing loss may be suffered by clinging to a name that has become a misnomer. Some conspicuous examples have proved that the disadvantage inherent in the mere fact of change is more temporary and less serious than we were accustomed to think."

In less than three years, your f.f.j. will celebrate its 100th birthday. Should it start the second 100 years with a new name? Some here in New York think we're so well known that it doesn't matter what we're called.

What do you think?

Up and Up

We felt a little better the other day when the Government came out with figures showing that the average American family's expenditures are approximately six per cent greater than its income.

You remember the story of the economics student who asked his professor, "Is there any set rule to estimate the cost of living?"

"Certainly," said the prof. "Take your income and add 25 per cent."

Omen

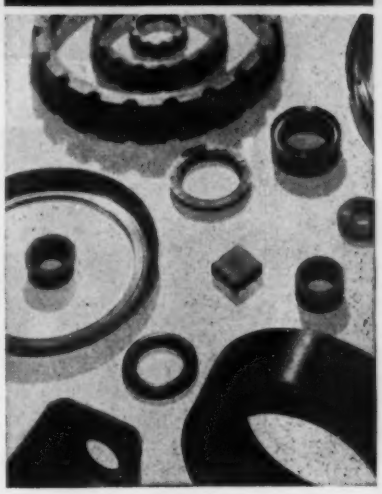
Possibly symbolic of the new approach being taken by General Eisenhower to the election campaign is the fact that New York campaign headquarters have been moved to the Hotel Commodore. Republican headquarters for all recent previous campaigns were the Hotel Roosevelt. The latter, of course, was named for Teddy, not Franklin, but still the name over the door could not help but have a dampening psychological effect.

Puzzler

Now that vacations are just about over, you may want to warm up gradually by trying this one:

A farmer wishes to dig a connecting trench from the upper left corner of a plot 100 ft long by 50 ft wide to the lower right corner. The ground along the extreme left border (100 ft long) is sandy and can be dug at a rate of $1 a foot. The remainder of the plot is rocky, and digging there costs $2 a foot. What arrangement of the trench will cost least?

Unsurpassed Synthetic RUBBER COMPONENT PARTS



Users of Acadia Synthetic Rubber component parts in hundreds of industries have found them unsurpassed. No matter what function synthetic rubber must perform, depend on Acadia parts. They best meet exacting specifications and operating conditions such as moisture, oil, heat, wear and age resistance. Molded, extruded, die-cut to close limits—compounded to meet specific conditions. Acadia engineers will gladly cooperate.

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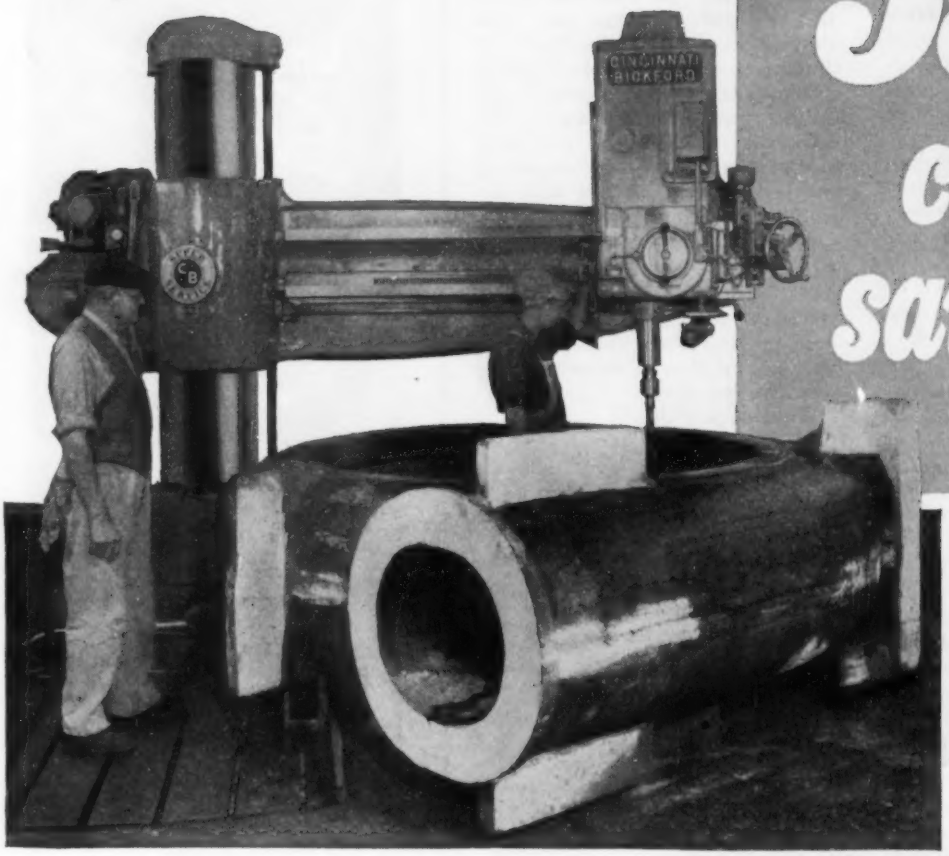
This BICKFORD effected a 35% cost saving!

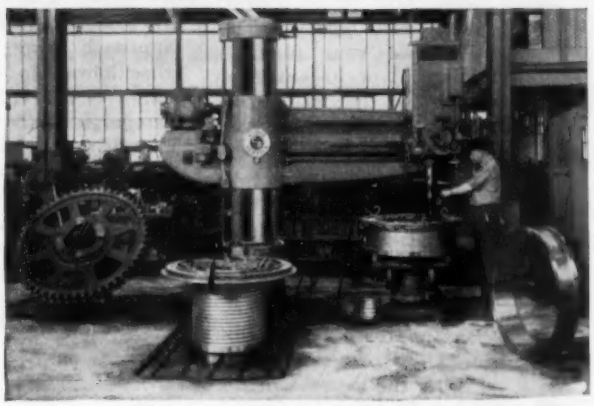


Drilling large centrifical dredge pump housing. This 7 arm, 19" diameter column Cincinnati Bickford Super Service, equipped with triple base, allows setup of two jobs while the third is in process.

The efficient drilling department at the National Supply Company of California effected a 35% cost reduction in drilling operations with this Cincinnati Bickford Super Service Radial Drill.

Here the many feeds and speeds of the Cincinnati Bickford Super Service Radial Drills—and their rigid construction—combined with their easy operation—handle a variety of heavy duty jobs with outstanding dependability at low costs.

Write for Booklet R-29 on these powerful, accurate Cincinnati Bickford Super Service Radial Drills.



Drilling and tapping a clutch housing. Note the second housing ready for drilling on one of the triple bases of the machine. No time lost in setup.

Photos—Courtesy of National Supply Co., Torrence, Calif.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio U.S.A.

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► In pilot plant operations steel strip has been successfully aluminum coated by a new continuous process in which no inert atmosphere is needed. The strip is run through a molten bath of 43S aluminum. Good adherence and smooth even coatings are reported.

► Two large orders for titanium have just been placed. One involves 23 tons of titanium alloy bars for jet engine structural parts. The other order covers 10 tons of commercial purity sheets to be fabricated by Rohr Aircraft Co. for a Boeing plane. The two orders total to just over $1 million.

► Smuggling of minerals out of Portugal is reported in Europe. Portuguese wolfram and tin mining is booming because of Western rearmament. Even mines previously abandoned have been resurrected. Established mines are working at top capacity. U. S. purchasing is also aiding lead mines of a neighboring country, Spain.

► Surprising comeback of the auto industry following the long steel strike shows Detroit's recuperative powers. Some observers are attributing the fast getaway to big inventories. Sources closer to the production scene say biggest factor is ingenuity in balancing steel stocks that were dangerously low when strike ended.

► Industry analysts figure steel capacity will reach 115 million ingot tons by end of this year, 117 million tons by mid-1953, and 119 million tons by end of 1953. As finished steel products, this is 86 million, 87.5 million, and 89 million tons, respectively.

Even with estimated direct defense requirements of about 8 million tons of finished steel, forecasters see a first half 1953 operating rate of 95 pct of capacity. A drop to 90 pct may come in the last half. Some say even this is on optimistic side.

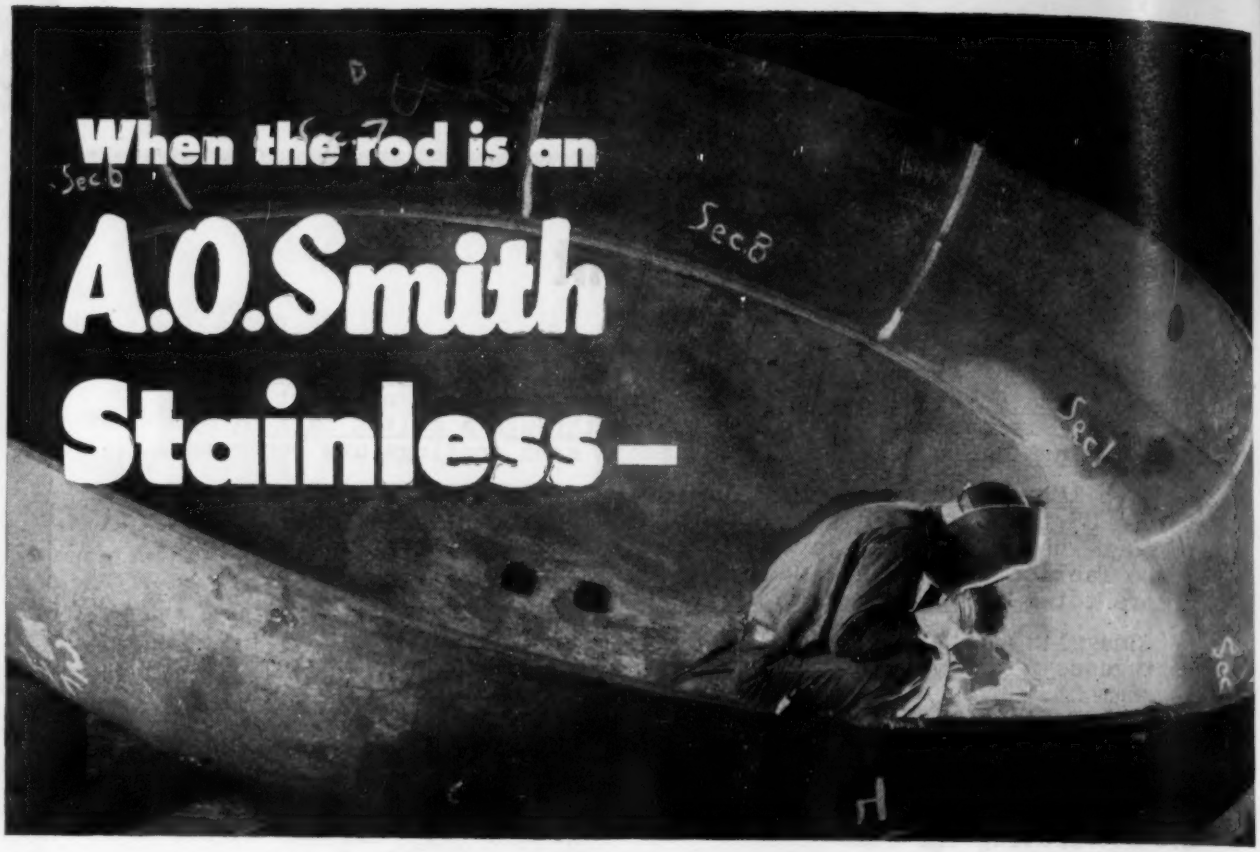
► The boom in conversion steel may be short-lived. Interest of its principal clients--autos, appliances--has only been on a short term basis. Now observers say conversion by auto industry is due to slip suddenly in November. Little conversion is being booked after October. Bonuses on conversion don't get good results.

► Although less spectacular, less costly than automation in the machine tool field, automation in the forging line promises to be of substantial importance to industry. Several completely automatic forging lines are already operating. Even medium size forging shops are expected to get more deeply into automation.

► Plastic bodies constitute today a more important threat to steel than at any time in automotive history, say some informed observers. Sports cars are expected to come out with plastic bodies. Greater use of plastic panels on short run, full size models is also seen. Another strong plastic possibility is plastic dies for sheet metal forming--which may become genuinely important.

Meanwhile hardtop auto styling rides a tall crest of popularity. Over 1 million hardtops are on the highways. And almost without exception all new car bodies to be introduced in late '52 and in '53 may feature hardtop lines or modifications.

► Naval Ordnance Laboratory, White Oak, Md., has built a rotary accelerator which can simulate accelerations in the 100 to 500g range for several seconds. It will be used to study effects of friction and inertia on rocket fuses.



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You, too, can eliminate field failure due to weld corrosion, with A. O. Smith stainless electrodes . . . your "insurance policy" that *your* specified requirements are met *exactly.*

"Tramp" steel cannot enter for manufacture because our quality control prevents it. No incoming coil of stainless core wire is ever acceptable for processing until exacting chemical, metallurgical and *spectrographic* analyses *prove* that it matches our specifications from end to end. This assures you of receiving the exact type and analysis of stainless to meet your job specification.

For your protection here are some of *our* controls: No more than one splice is permitted in any incoming coil. Why? So that, when we clip samples from each end of each coil for analysis, no part of any coil can escape the test. Then, when approved coils are straightened and cut, the wire is immediately sealed in boxes to prevent mixing of lots.

As one of the largest users of stainless electrodes in building stainless vessels, A. O. Smith knows that these tests and precautions are necessary to assure top-quality production. No other electrode producer subjects stainless core wire to the exacting spectro-analysis, chemical and metallurgical tests as is done by A. O. Smith.

When you buy A. O. Smith stainless electrodes, you receive this matchless assurance of highest quality without paying any premium! A compelling reason for *insisting* on A. O. Smith stainless every time!

We'll welcome the opportunity to demonstrate A. O. Smith stainless electrodes on your job.

Write for free pocket-size electrode handbook.

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ALL-POSITION

Electrode	AISI Type
SW-151	502
SW-152	505
SW-153	410
SW-154	430
SW-157	347
SW-158	317+Cb
	318
SW-159	310
SW-160	316
SW-161	317
SW-162	308
SW-166	309
SW-168	310+Mo
SW-169	310+Cb
SW-357	347
SW-359	310
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STEEL: Better Times Coming in Early '53

It will be rough for manufacturer seeking steel until end of first quarter next year . . . After that shortage seen making exit . . . Some products to ease first—By J. B. Delaney.

Memo to steel consumers: That dark cloud has a silver lining, but don't expect it to peek through until the end of first quarter '53. After that, look for clearing skies and a steadily rising barometer.

That's the way many steel executives and government planners figure it. They see the Ides of March as the turning point in the struggle to bring steel supply and demand into some sort of balance. Steel people are not unanimous on this. Some think we won't be over the hump until second quarter.

More or Less?—Difference of opinion is due to uncertainty over whether steel users will want to rebuild inventories to pre-strike levels, which were abnormally high, or whether they will settle for something less. Military demand is another uncertainty.

NPA's 30-day limit on inventories will be of some help in realizing better distribution. But it's questionable whether universal enforcement is possible, since NPA's staff of compliance personnel is limited. Consensus is that the 45-day limit in effect before the strike was largely ignored.

Barring an unexpected spurt in defense requirements, one thing seems certain: Pressure on steel availability will ease considerably late in first quarter and consumers will have an easier time of it in second.

Steel producers feel that government controls on production and distribution will not be justified after the first quarter.

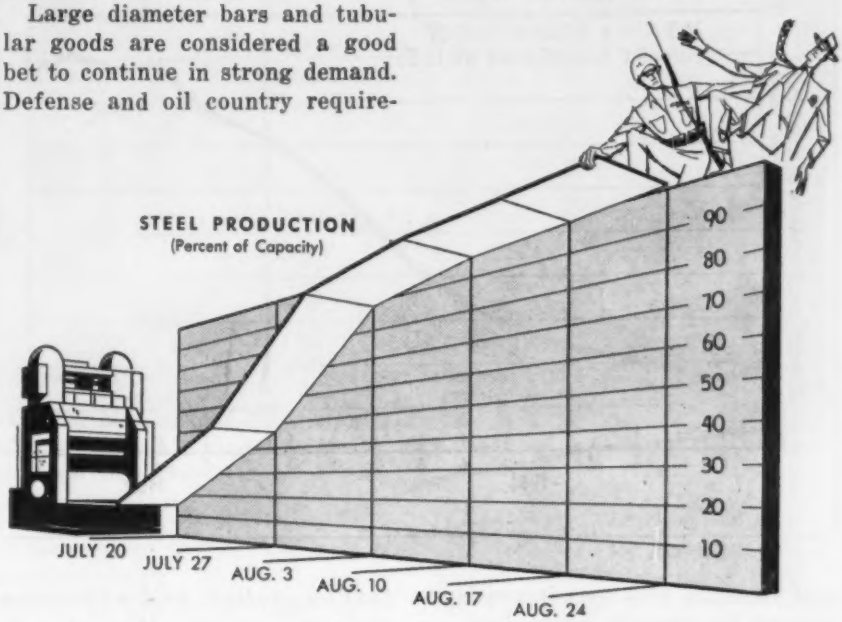
Uneven Availability—Industry analysts usually couple their forecasts with the warning that steel supply should not be expected to become plentiful in the first quarter or early second quarter, except for some products. Demand for wire products already is showing signs of easing. Small bars and flat-rolled also will be watched for weakness.

Large diameter bars and tubular goods are considered a good bet to continue in strong demand. Defense and oil country requirements for these products show no sign of abating.

Defense Production Administration is talking about steel supplies approximating pre-strike levels during the first quarter. This probably is optimistic.

Steel inventories took a terrific shellacking during the strike. They dropped from an estimated 18 million tons on June 2 to about 8 million tons at strike's end, exclusive of warehouse inventories. High inventory explains consumer complacency during early stages of the strike. Fourteen million tons is considered to be ample now.

Indications are that consumers generally will live hand-to-mouth for the remainder of 1952. Industry sources estimate that only 2 million tons will go into inventory during this period. Government estimates run as high as 4 million tons. At best, inventories are not likely to attain the pre-strike figure of 18 million tons before second half of 1953. A "normal" inventory of 14 milion tons is looked for at end of the first half.



These forecasts take into account increases in steelmaking capacity, which today exceeds 112 million ingot tons, compared with 108.5 million last January 1. By year's end it will reach 115 million tons. (See p. 87.)

Some industry sources figure mills should be producing at the annual rate of 86 million tons of finished steel in first quarter '53. They estimate first quarter demand, including military but excluding additions to inventory, at an annual rate of 80 million tons. This would leave 1.5 million tons available for inventory building in the first quarter. More headway will come in the second quarter.

MAGNESIUM: More Rolling Mills

Ingot output will top government goal for '52 . . . Brooks & Perkins starts new 84-in. mill, Dow rolls on new 66-in. mill . . . Gremlins delay Dow coiling mill—By *R. L. Hatschek.*

Despite high demand for magnesium, supply of the light metal came into good position early this spring. Reactivation of six government-owned plants brought production totals up fast. But still a shortage of thin gage sheets prevailed because of inadequate rolling mill facilities plus ever-increasing demand for wrought magnesium.

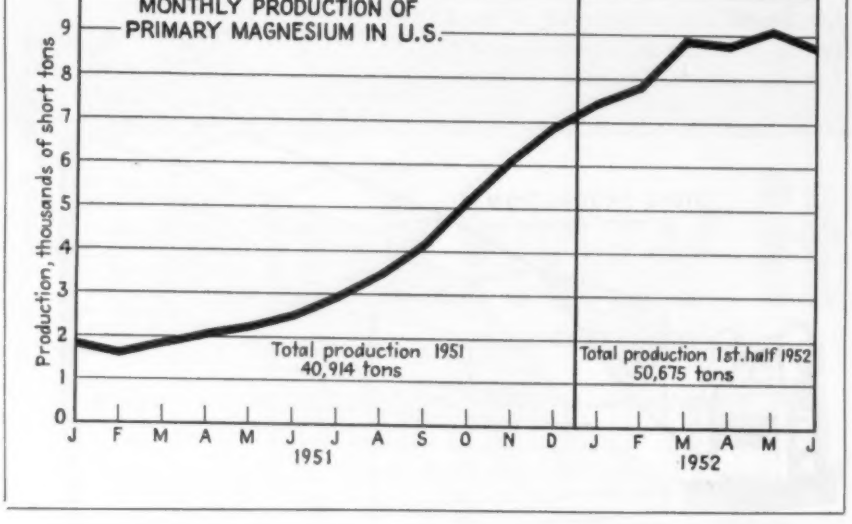
The government plants, located at Wingdale, N. Y., Canaan, Conn., Painesville, Ohio, Spokane, Wash., Manteca, Calif., and Velasco, Tex., total about 100,000 tons per year of capacity. Add to this Dow Chemical Co.'s 24,000-ton plant at Freeport, Tex., and you get the picture of this country's capacity.

Pre-Korea demand was on the upgrade but was so light that a monthly output of only 1000 tons was sufficient for all purposes. Today's production is running about 9 times as great as a result of increased aircraft output and higher demand for other defense and civilian goods. Output for the year will probably hit 105,000 tons or more, well over goals set by the government last year.

Growing Up—This lightest of all structural metals is used primarily in the form of castings but engineers are designing more and more parts to be made of extruded, forged, rolled and otherwise wrought magnesium. Aircraft such as Boeing Airplane Co.'s monster B-36 use considerable quantities of magnesium sheet skin. The Sikorsky S-55 helicopter is another example of extensive use of magnesium sheet and forgings.

People in the light metal industry have been very pleased by this trend and point it out as a sure sign of maturity in the relatively new metal. But sheet rolling capacity just hasn't been able to keep up with the vastly increased demand in spite of a substantial rise in production capacity.

There were only two mills in operation, both 4-high hand mills capable of rolling sheet only up to 48-in. width. They are operated by Dow at Midland, Mich., and Aluminum Co. of America at New Kensington, Pa.



New Mills—But the industry got busy and started to build new, bigger and better rolling mills. Brooks & Perkins, Inc., a leading magnesium fabricator in Detroit, decided to roll its own.

Construction was started on the Livonia Mill Div. less than a year ago and the mill has just been started in operation. The entirely new mill is complete with facilities for casting its own rolling ingots as well as the conventional jobs such as cropping, shearing, annealing, and cleaning sheets. Both hot- and cold-rolling will be done.

The rolling mill itself consists of three stands of 28 to 84-in. mills. They will produce sheets and plates in standard lengths, widths and gages to the tune of an estimated 200,000 lb per month. Rolling of sheet lighter than 0.051-in. thickness is not contemplated at present. Brooks & Perkins plans to supply commercial orders as well as all it needs for its fabricating plant.

Bugaboos—Dow Chemical is not far behind. This company, the only privately owned producer of primary magnesium, has been busy installing a pair of sheet rolling mills at its Madison, Ill., plant. One is an 84-in. continuous coiling mill and the other is a 66-in. hand mill.

The 66-in mill has been in operation since June 1, 1952. Alloy ingot will be shipped from Madison beginning in January, 1953. Construction program for other fabricating facilities is continuing.

Unfortunately, the company has been having more than its share of troubles in getting the big one into operation. It is not going as yet despite an originally scheduled start in the spring. Delays in getting electrical and other equipment pushed initial operation schedule into the summer but even more gremlins have prevented the long-awaited start-up.

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QUAKE: Industry Hurt, Not Crippled

Second earthquake in Bakersfield area in 32 days puts damage total at about $35 million . . . Boom in warehouse steel business results . . . Southern Pacific unscathed—*By T. M. Rohan.*

Earthquakes are an act of nature. But citizens and industry alike in Bakersfield, Calif., would be happy with a lot less nature after being shaken by the second earthquake in the area in little more than a month.

Although quake damage around Bakersfield is roughly estimated at $35 million, industrial and manufacturing facilities, such as they are in a town of 110,000, were clawed but not mangled. Buildings were the major casualty of the sharp tremors.

Hardest Hit—Of Bakersfield's business concerns, Kern County Implement Co., local International Harvester dealer, probably suffered the most from the double-dealt damage. The Tehachapi quake on July 21 wrecked the Kern building so badly that it was being dismantled. Then the second quake struck. This time the ceiling plummeted through the floor, killing one worker and injuring others.

Amid the indiscriminate damage wrecked by the latest earthquake, there were the customary freak escapes. The 2-year-old Kern steam plant 6 miles from town was unscathed despite the fact that its 60,000 and 100,000 kw turbines were going at 3600 rpm when the shock occurred.

No Fires—Pacific Gas & Electric Co. got off with only a mass of small 70 kv outages and two small broken gas mains. First quake had knocked 850 of the plant's distribution transformers off their poles and caused a 5-day shutdown in service. This time service was restored in 1½ hr. Gas service to damaged building was shut off immediately and as a result there were no fires.

A 20,000 bbl oil refinery 5 miles from town suffered no damage although another refinery had been gutted by fire as an aftermath of the earlier Tehachapi quake.

Southern Pacific Ry., which spent $2 million repairing trackage after the July earthquake (THE IRON AGE, Aug. 21, 1952, p. 83), was fortunately not revisited by the second quake.

UPHEAVED: Quake damage to Southern Pacific Ry. track east of Tunnel No. 1 on Tehachapi Mountain. View is from south side of track.

Ill Windfall—One ironic effect of the tandem tremors has been a business boom for steel warehouses in the area. Like warehouses throughout the country, Bakersfield suppliers found their stocks completely shot after the prolonged steel strike. But because of the July 21 earthquake, they were granted emergency steel allotments by National Production Authority. These have been moving fast.

U. S. Steel, Bethlehem and Pacific States made available emergency shipments of ⅝-in. steel and smaller reinforcing bars. One local warehouse and fabricator unloaded 100 tons of steel the week after the first quake and expects even heavier demand now that disaster has struck the area again.

Much of the Bakersfield steel supply had been used in construction at the Inyokern, Calif., Navy rocket test station. But since the earthquakes, progress on the Navy project as well as civilian construction has been slowed as workers concentrate on bracing and repairing quake-weakened buildings.

Quake Primer—It's a hard way to learn, but the damage dealt by the disasters did teach some important safety lessons. An IRON AGE survey showed:

Major damage was to older buildings.

Machinery withstood the shocks very well, but falling debris took its toll. Motors are automatically cut out by short circuits from contact between swaying wires.

Tilt up type walls (reinforced concrete poured horizontally, then raised, with its protruding beams welded) weren't damaged.

Small precision equipment stored on shelves fell to the floor and was badly battered.

Vertical piping and shafting suffers if the ground shifts back and forth. Horizontal members are affected by swells. One or the other usually escapes.

Belt-driven machinery stands up well because of its separate mountings.

Extra heavy flooring such as that used in telephone buildings for solid support of sensitive apparatus has good resistance.

STEEL: Supply Optimism Grows

Government belatedly recognizes improved stocks of steel for construction . . . Hint control change in 60 days . . . Will ease allocations, allow starts on recreational building.

Government's belated—but now steadily growing—optimism over the rapidly-improving supplies of steel for construction is reflected in its current hints that construction regulations may be substantially eased in about 60 days.

Proposals now under study at National Production Authority to ease the current construction rules applying to use of steel, copper, and aluminum are to permit (1) increased amounts of controlled materials that may be self-authorized, (2) starts on recreational and amusement construction, which has been banned for the past 2 years.

After April — NPA's tentative target date for effectiveness of the rewritten rules actually is Apr. 1—on paper. But if the prospects for adequate supplies of materials are bright enough on Nov. 1, the agency says it will forget about the Apr. 1 date and make the relaxations effective much earlier. Exact date is yet to be determined.

Immediate effect of this change in NPA thinking will be the placing of orders for the steel, copper, and aluminum necessary to construction of bowling alleys, swimming pools, theaters, roller-skating arenas, and other recreational/amusement projects. Actual use of these materials still is prohibited until Apr. 1 or whatever earlier date is decided upon by NPA. Orders may be placed and deliveries made at any time, however.

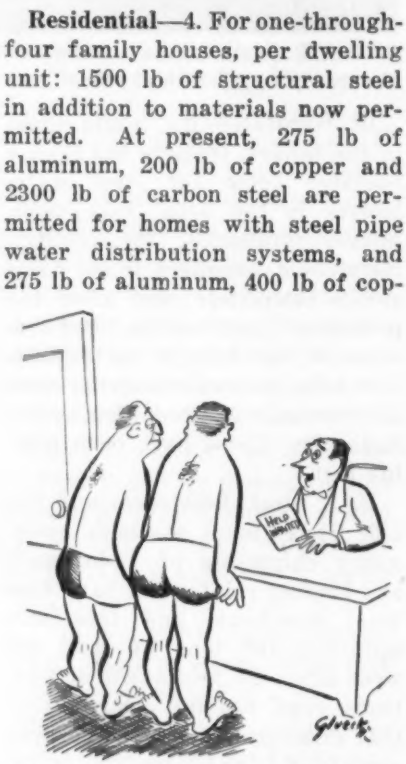
New Order—Under present plans, a new Dir. 8 to CMP Reg. 6 will permit, not later than Apr. 1, self-authorization up to the following amounts:

1. For recreational, entertainment and amusement construction per project, per quarter: 5 tons of carbon steel (not to include more than 2 tons of structural shapes), 500 lb of copper and copper-base alloys, and 300 lb of aluminum. Previously, no self-authorization was permitted for this type of construction.

2. For elementary and secondary schools, per project: 50 tons of carbon steel (not to include more than 7 tons of structural), copper — 5000 lb, and aluminum—4000 lb. Present limits are 5 tons of steel, 1000 lb of copper and 2000 lb of aluminum per project, per quarter.

3. For highways, per project: 25 tons of carbon steel, (not to include more than 12 tons of structural) and the same amounts of copper and aluminum now permitted—500 lb of each. Present steel limit is 25 tons, not to include more than 2 tons of structural.

Residential—4. For one-through-four family houses, per dwelling unit: 1500 lb of structural steel in addition to materials now permitted. At present, 275 lb of aluminum, 200 lb of copper and 2300 lb of carbon steel are permitted for homes with steel pipe water distribution systems, and 275 lb of aluminum, 400 lb of copper, and 1950 lb of carbon steel for homes with copper pipe distribution systems. Present extra copper allowance for forced hot water heating and radiant heating are continued unchanged.



"Well, yes . . . we did advertise for unskilled labor."

5. For multi-unit residence (walk-ups), per dwelling unit: 2 tons of carbon steel (not to include more than 500 lb of structural), 200 lb of copper and 275 lb of aluminum. At present, no self-authorization for this type of construction is permitted.

6. For multi-unit residences (elevator-type) per dwelling unit: 3 tons of carbon steel (not to include more than 600 lb of structural), 225 lb of copper, and 275 lb of aluminum. No self-authorization for this category of construction is allowed at present.

7. All other construction, per project, per quarter, 25 tons of carbon and alloy steel, including structural (not to include more than 2½ tons of alloy and no stainless), 5000 lb of copper and 4000 lb of aluminum.

Limits—As the regulations stand now, all types of construction except industrial are permitted self-authorization of 5 tons of carbon steel (not to include more than 2 tons of structurals but no wide-flange beams or sections), 1000 lb of copper, and 2000 lb of aluminum, per project, per quarter.

Current distinctions between "industrial" construction and "all other" construction are to be eliminated. Projects in both categories will be on equal footing with regard to self-certification quantities. The category "all other" includes commercial, public, hospitals, university, public utility, water and sewage projects, and transportation projects.

Dollar-limit on DO rating authority for purchase of non-controlled building equipment and production machinery is to be raised to $15,000 for building equipment, $5000 for production machinery for recreational construction, $100,000 for building equipment and $200,000 for production machinery for "all other."

UNIVERSITY OF MICHIGAN LIBRARIES

GEARS: Case History on Precision

Gears play big role in electronics equipment . . . Precision is imperative . . . Initial steps of preparing gear blank and boring a true hole starts Arma's production—By *T. Metaxas.*

The flustered sailor on a battleship spotting a guided missile hurtling nearer may have a fraction of a minute to train his computer-directed guns at that lethal chunk of steel and explosive. Marksmanship of the electronic range finder had better be perfect because there is not a smidge of leeway for error.

Precision equipment must have precision gears—else electronic impulses could not be translated into their accurate equivalents in motion. Synchronization of gears must be perfect.

Backlash of "wobbly" gears with their cumulative effect on the final gear of a train would send electronic gun aiming astray. Without precision gears in his range computer the sailor facing the missile might just as well let fly with a shotgun.

Slogan of Precision — Arma Corp., of Brooklyn, N.Y., one of the major producers of the electronic devices which aim the guns, detect the enemy, has a slogan of precision in making its own gears. Into Arma's diversity of electronic equipment go thousands of gears in many sizes, many tolerances. About 25 pct of Arma gears are made to runout tolerances of .0003 in. and another 25 pct to .0004 in. Fifty pct of the gears are made in sizes below 1 in.—and final inspection often includes examination through a jeweler's eyepiece.

Gears of .0003 in. runout tolerance match in precision the master gears used to test production gears in measuring equipment. They are roughly twice as precise as the most superior watch gears, and as a measurement .0003 in. is equal to one-twelfth the thickness of a sheet of paper.

Basic premise at Arma is that ultimate precision of a gear is founded on care taken in preparing the gear blank and boring a true hole for the arbor. Boring an exact inside diameter ensures a follow-through of precision in later machining and teeth cutting operations. On the other hand, imperfect boring of a hole at the start will certainly lead to rejection later.

780544-8

ARMA CORPORATION — STANDARD LOT _____

OPERATION SHEET — USE THIS SHEET FOR LOTS OF _____

DEPT	OPER. NO.	OPERATION	TOOLS	Set Up Time	Pce Pc. Time
899	10	Furnish material 2 1/16 dia. Naval Brass (46-B-6) ½ H (47° ± 100 pcs)			
835	20	Drill 5/32° dia. hole.	Turret lathe #5 Std tools		
		Face End. Turn O. D. 2.000 dia. to .000 -.002° Form 7/16° dia. to .093° flange thickness. Rough bore .1872 ∮ .0025 -.0000 dia. hole -.006 Cut off 9/32° dim.			
835	25	Finish bore .1872 ∮ .0003 -.0000 dia. hole.	Pneumatic std tools		
825	28	Inspect.			
230	30	Cut teeth to ∮.002 max on P. D.	Gear hobber #3 Std tools Wire brush		
230	40	Burr teeth			
230	50	Shave teeth	Gear shaver		
230	60	Check Rod Liner	Rod liner		
825	70	Check gear			
825	80	Inspect. Stamp part no. Submit to gov't insp Send to stock			
		NOTE: TAPER PIN DRILLING TO BE DONE AT ASSY			

ISSUED BY	DATE	JOB NO	NAME OF PART	REV	SHEET NO	NO OF SHEETS	PART NO
RWO:CHK:ed	REVISED 6-5-50	4PX-1	Spur Gear	5	1	1	780544- 8

Precision Boring — Arma uses precision boring machines—a not-general practice for regular industrial gears which frankly need not be built to such exacting runout tolerances. While some gear makers (quite rightly) finish their gears on turret lathes, Arma must use an additional precision boring operation to bring the hole within closer tolerances. Performance of a gear depends greatly on the concentricity of its rotation.

In deciding to make its own gears, Arma considered the demerits of farming out its frequent, varying small lot jobs through cumbersome competitive bidding. Arma believes it is doing its own gear work more efficiently and at less cost, at the same time allowing a closer tie-in to finished equipment production.

Contract gear shops could no doubt bore that same exact hole in an identically precise blank. But with Arma's captive shop its repetitive gear jobs give machinists growing familiarity with Arma specs and needs.

Keep the Arbors—Contract shops finishing an Arma job would tend to discard the arbors, finding it difficult to stock these holders for each customer on the frail assumption another similar job will arrive shortly. At Arma, arbors are retained, used again, and then reclassified into smaller categories as they wear.

Unless it is truly an industrial titan, a company wishing to make its own precision gears cannot plunge into a massive cash investment for a multiplicity of special machine tools. Arma equips its shop with standard tools.

Labor costs in producing precision gears spiral loftily when compared to the common variety. Yet there are compensating factors. It's acknowledged that machine tool set-up time to build precision into a gear at the very beginning is arduous. Even gear cutting time is slowed a notch or so to assure a certain finish. But inspection time on precision gears is considerably less than with gears made to broader tolerances.

Turn Page

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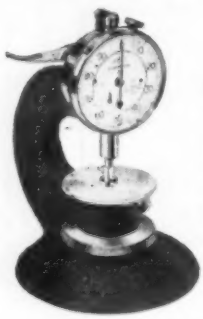
FOR *Strictly* IMPERSONAL INSPECTION CHOOSE AMES DIAL COMPARATORS

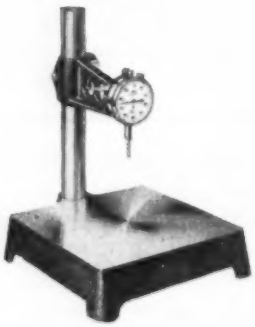
Ames Dial Comparators make the inspection of duplicate parts an extremely simple, rapid and accurate operation. Ames Comparators are strictly impersonal in their accuracy — the results being in no way dependent on the skill or judgment of the operator. The pressure of the gauging members against the work is mechanically determined and therefore uniform.

Check the Ames Dial Comparators shown — one of them may solve a Quality Control problem for you.

Ames No. 1 Dial Comparator is an easily adjustable bench model that measures objects up to 2" in cross section. The table bracket may be quickly located and locked in position on the column. The table itself may be further positioned and locked for final fine adjustment. This comparator is designated *Ames No. 1W* when equipped with dead-weight contact pressure and contact area to ASTM specifications for measuring resilient materials, such as rubber, plastics, etc.



Ames No. 2 Dial Comparator is a compact, stable bench model for measuring non-yielding materials — sheet metal, glass, hard rubber. The 2" diameter table is adjustable to bring pointer to zero. *Ames No. 2W* is similar to the Ames No. 2, but is furnished with dead-weight contact pressure and contact areas to ASTM specifications for checking textiles, plastics, sheet rubber, etc.



Ames No. 13 Dial Comparator features flat-ground, cast-iron base of ample size for using V-blocks and locating fixtures for checking rounds, flats and odd shapes. Also, the No. 13 can be fitted with a fine adjustment for close setting. Accurately adjustable bracket holds any Ames Micrometer Dial Indicator.

Ames No. 130 Dial Comparator is designed especially for inspecting comparatively large parts. For this reason, the flat-ground steel base, the adjustable indicator support on which can be mounted any Ames Micrometer Dial Indicator, and the upright column are proportioned to suit the user's particular requirements.

Send us your Quality Control job specifications, and we will supply complete details and proposal without obligation.

Representatives in principal cities. B. C. AMES CO. *25 Ames Street Waltham 54, Mass.*

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

—Manufacturing—

Torpedo Range — When IRON AGE visited Arma's gear shop, the foreman pointed out what he believed was something unusual in gear making. This was a large spur gear cut from a spline hole and hobbed to size in one operation of two cuts. The heavy cut left .020 in. for finishing. The gear had a total runout of .0006 in., a 20 pressure angle, and 45 teeth.

It was interesting to note that a machinist expressed doubt over the inspection fate of a gear then being finished. He was reassured by the foreman that preciseness on the arbor would carry the gear through to acceptance.

A World War II experience at Arma (the exception to the rule) points out importance of gears in electronics equipment. Trial checks were being conducted on a submarine torpedo data computer with 35,000 parts of which 10 pct or 3500 were gears. Awry operation of the computer and urgent need of the Navy stirred consternation at Arma.

A mathematician was hustled to the scene. Basing his calculations on the results of the trial runs, he plotted out the trouble. Amid some snorts of disbelief, the computer was disassembled at a certain spot and the trouble-making part pulled out. It was a solitary gear that somehow had one tooth too many.

"A thou off? It looked O.K."

STEEL: West German Imports Mount

Belgian exports of semi-finished steel to West Germany expected to be 1.2 million tons during the year . . . But German production rates continue to climb—By E. C. Kellogg.

A surprising development in the European steel market has been the increase in West German imports of semi-finished steel from Belgium. This situation was pointed out by Kurt Orban, Kurt Orban Co., Inc., New York, major U. S. importer of steel and machine tools, in an interview with THE IRON AGE magazine.

From June, 1952, until June of next year, West German imports of Belgian steel are expected to reach 1.2 million tons. This figure represents 55 pct of Belgian steel exports.

Production Up — Increase in West German steel imports is not a result of slackening production rates. Mr. Orban, who recently returned from Germany, said the country's steel output is advancing quite rapidly. Last year's production was between 12 and 13 million tons and is now around 16 or 17 million. By the end of next year the West German output is expected to hit the 20 million mark and may soar to 23 million tons within 2 years.

A primary factor in the inflated West German steel consumption rate has been a higher level of business activity and mounting exports. Recent elimination of custom duties on semi-finished steel items has also made it easier for West Germany to import billets, sheet bars and wire rods from Belgium.

Favorable Balance—Further incentive to an increase in West Germany steel imports is the fact that during the last year the country has changed from a debtor nation to a creditor position in the European Payment Union. This switch is primarily a result of an increase in its own exports.

A symptom of West Germany's improved economic condition is the rise in value of black market marks to within 5 pct of established rates.

Mr. Orban described the European steel market as being fairly firm internally. Demand for open-hearth grades is strong in all countries, while general demand is highest in Germany and France.

Prices Spiral—Steel prices have dropped considerably since last year, Mr. Orban said. Price cutting on export items reached its peak in July but began to firm in August. Reinforcing grades which brought $140 per metric ton in '51 dropped to $100 in July. Price at present is between $103 and $105.

Effects of the U. S. steel strike have not been felt in Europe as yet, Mr. Orban told THE IRON AGE. Whether steel prices will go up as a result is something that cannot as yet be determined. Barring heavy demand from the U. S., Mr. Orban expects prices on reinforcing grades to drop to $100 or lower by the first quarter. And he anticipates a similar trend in other grades.

Estimated World Steel Capacity and Output

Thousands of Net Tons of Crude Steel — Add 000

	Output 1951	Annual Capacity Jan. 1, 1952 Tons	Annual Capacity Jan. 1, 1952 World %	Estimated Output 1953
United States	105,140	108,592	43.69	117,700
Canada	3,567	4,409	1.78	4,950
Latin Am., 4 countries[1]	1,814	2,067	0.83	2,772
Total 6 Am. countries	110,521	115,068	46.30	125,422
United Kingdom	17,516	20,062	8.06	19,800
France	10,836	11,299	4.55	16,280
Saar	2,867	3,031	1.22	
W. Germany	14,884	18,739	7.54	15,950
Belgium	5,516	5,787	2.33	6,050
Luxemburg	3,393	3,582	1.44	3,520
Sweden	1,657	1,929	0.78	2,255
Italy	3,362	3,858	1.55	3,410
Other Free Europe[2]	3,664	4,136	1.67	4,774
Total Free Europe	63,695	72,423	29.14	72,039
Japan	7,167	9,094	3.66	7,590
Other Free Asia, Africa[3]	4,330	5,126	2.06	5,610
11 Small Countries[4]	209	303	0.12	[6]
Total Miscellaneous	11,706	14,523	5.84	13,552
Russia	34,502	34,722	13.97	41,470
Satellites[5]	10,088	11,795	4.75	13,750
Iron Curtain Total	44,590	46,517	18.72	55,220
Est. World Total	230,512	248,531	100.00	266,453

[1]Argentina, Brazil, Chile, Mexico; several small countries not included.
[2]Austria, Netherlands, Norway, Switzerland, Turkey, Finland, Spain, Yugoslavia.
[3]Australia, India, Union of South Africa.
[4]Colombia, Peru, Uruguay, Venezuela, Denmark, Greece, Ireland, Portugal, Thailand, Algeria, Morocco.
[5]Czechoslovakia, E. Germany, Hungary, Rumania, Poland; data on Far Eastern satellites unknown but capacity small.
[6]Probably well above 352,000 tons but not estimated for several countries.

Sources: 1951 output and 1952 capacity from Iron and Steel Division, NPA. Output for 1953 estimated by United Nations in report dated April, 1952.

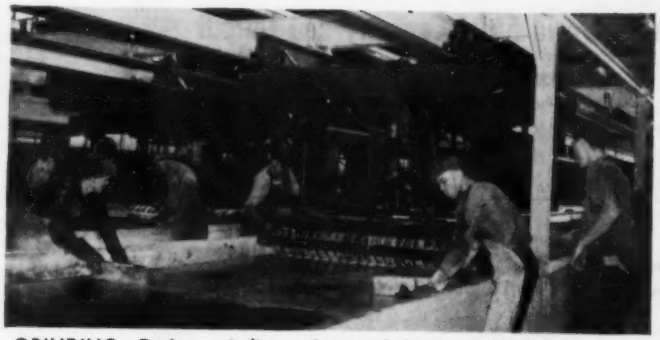
Compilation: American Iron and Steel Institute.

How Ford Co. Produces Its Own Windshield Safety Glass

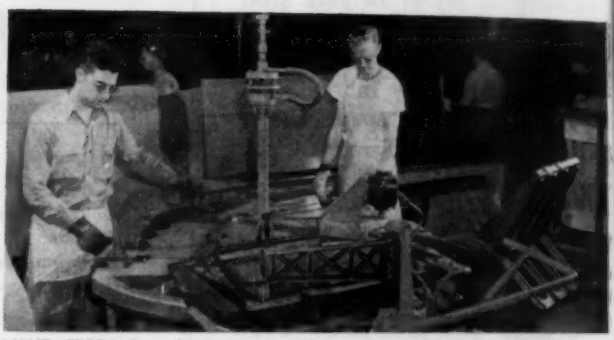
TEST: Molten glass is blown into spheres for periodic inspection at Ford plant.

Safety glass production for Ford car windshields reaches a yearly total of 11,085 ft. Manufactured at the Ford Motor Co.'s huge Dearborn, Mich., plant, the glass is produced in a continuous ribbon 52 in. wide and 3/16 in. thick. Annual output from the plant would stretch from New York City to Phoenix, Ariz.

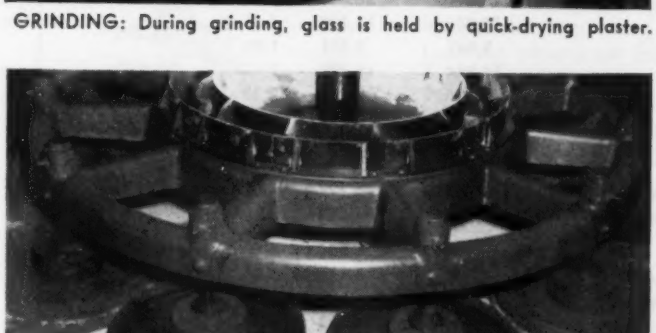
Ingredients used in the glass—silica sand, limestone, dolomite, soda ash, sodium sulphate and carbon—are shipped to the Ford plant by rail. But all other operations involved in the production of safety glass are carried out within the plant.



GRINDING: During grinding, glass is held by quick-drying plaster.

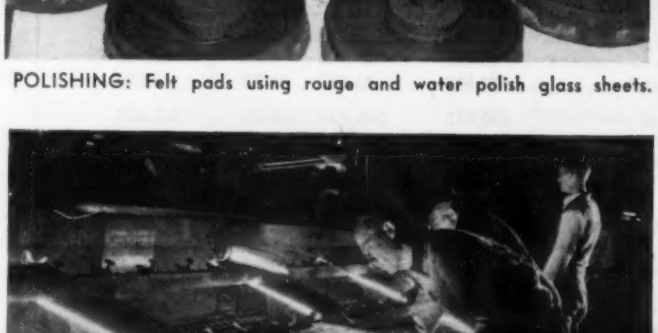


NEXT STEP. Template cutters silce safety glass to required shape.

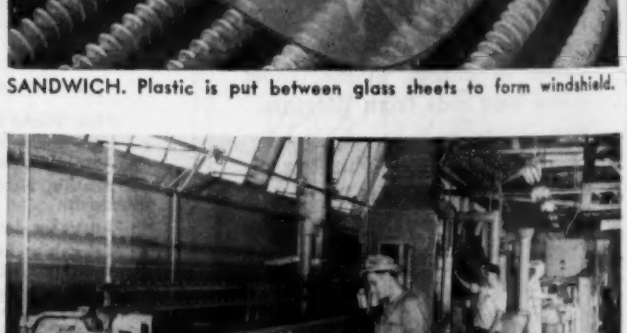


POLISHING: Felt pads using rouge and water polish glass sheets.

SANDWICH. Plastic is put between glass sheets to form windshield.



CUTTING: After inspection safety glass is cut for template cutters.



FINISHED: After autoclave process, glass is washed and packaged.

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AUTOS: Styling Big '53 Feature

Detroit readying new models . . . Tool troubles killed some new engine programs, put emphasis on styling . . . Basic bodies major item . . . Engine trend to V-8—By *R. D. Raddant.*

At this time of the year automobile companies take on many of the characteristics of expectant mothers.

By means of a thousand deceptive devices, they are still trying to conceal the fact that new models have been conceived and are developing rapidly. But there comes a time when symptoms are undeniable and the word gets out.

Everything is not predictable, of course. Dates of arrival can only be approximated. The same is true of many minor features of physical appearance and construction.

Through a mixture of old wives' tales, scientific research, gossip and guesswork, trends and patterns as well as many specific details are now established throughout the industry.

Face Lifting — Emphasis for 1953 will be on styling, for two reasons: Some of the major producers are overdue for a face lifting. Tooling bottlenecks have prevented the introduction of several new engines that might have entered the 1953 season.

New models will also show an increasing emphasis on basic body styles among the Big Three. Basic bodies were first exploited by General Motors, then adopted by Ford. Chrysler will no doubt extend their use.

Wide use of interchangeable bodies is an economic necessity. In itself it may be the biggest single factor in keeping manufacturing costs from soaring out of sight. As a result, styling differences within companies are now largely confined to front ends, fenders, bumpers, and rear decks.

Another trend is a bid to enter the sports car field. Buick has practically promised to produce the Skylark, a convertible with downswept fenders, cutback doors, wire wheels, and other flashy features. Packard has its Pan American which also may be adapted for production.

Chrysler and GM have both promised air conditioning units as optional equipment in some of their divisions.

Engine emphasis is on the V-8. They are much more compact and lend themselves to new styling trends. A V-style engine is also necessary for high compression. A great deal of talk is heard about a V-6, but a suitable engine of this type has not yet been developed.

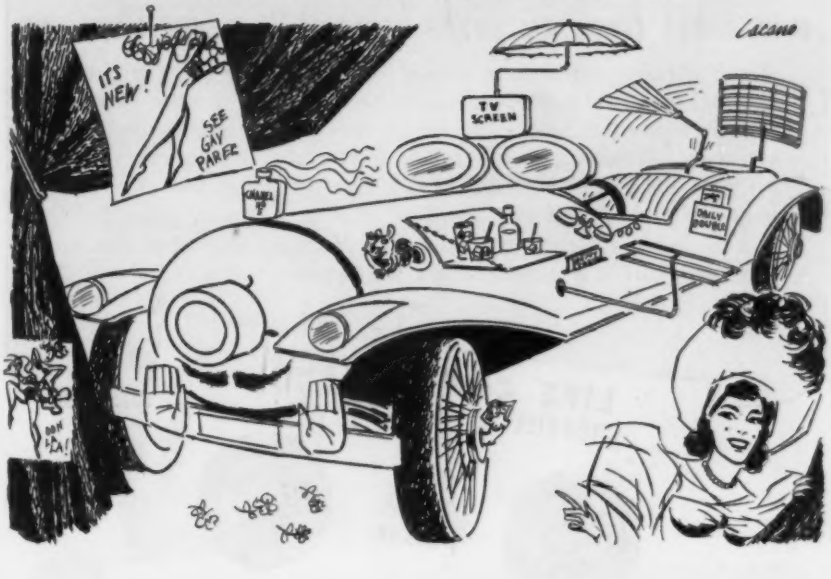
Outlook—This is how the new models shape up at the moment:

All Chrysler cars are getting radical styling changes, principally toward a lower and longer silhouette with greater visibility through wraparound windows. A more completely automatic transmission is under study and a torque converter may be available on Plymouths. Dodge will have a new "dome" style V-8 engine incorporating the best features of the present DeSoto and Chrysler engines.

While most models are not expected to be out before late this year, there is some speculation that Chrysler cars may jump the gun. They were scheduled for early introductions prior to the steel strike and still might get out ahead.

Ford, Lincoln, and Mercury will get only minor style changes following the major revisions of 1952. Ford engineers are working on new V-8 overhead valve engines for Ford and Mercury, as well as Ford tractor. These may not make it during 1953, however.

IRON AGE'S OWN EUROPEAN-TYPE SPORTS CAR



More Hp—Among General Motors divisions, Cadillac will try to increase its lead in the country club set by design changes and ultra-modern mechanical devices and power aids. As the pioneer in high compression engine design, Cadillac will put on more power in the hp race with Chrysler.

Buick, which started tooling for its new engine in ample time, will have a V-8 to replace the old in-line engine. Word is out that the Dynaflow transmission is getting a working over. Buick has made big sales showings with its emphasis

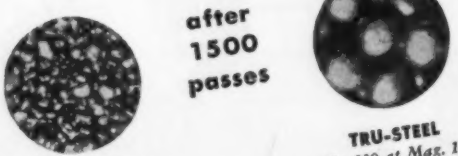
a
$ure $hot for $avings

TRU-STEEL SHOT

cuts blast cleaning costs because it never shatters

When abrasive starts to crumble, it loses its cleaning efficiency. Through annealing, drawing and other processes, the life of some iron abrasives has been increased so they can be sold as premium abrasives. However, a true steel shot is the only abrasive that NEVER SHATTERS. TRU-STEEL has the toughness that only steel can give. That's why Tru-Steel Shot lasts longer, cleans faster — costs less in the long run. It is made of high carbon steel that has received a *full* heat treatment, not just drawn or annealed.

LIFE COMPARISON
TRU-STEEL vs. CHILLED IRON SHOT



CHILLED IRON
No. 230 at Mag. 10x

TRU-STEEL
No. 230 at Mag. 10x

Tru-Steel Shot lasts many hours longer instead of breaking into the millions of sharp pieces that abrade the wearable parts of your cleaning machine. As a result, you not only have less abrasive to buy, but you also make large savings in replacement parts and maintenance labor.

Send for a trial order of Tru-Steel today.

THIS BULLETIN GIVES YOU THE FACTS
It shows where the average blast cleaning dollar is spent and how savings can be made. Send for your copy today.

American WHEELABRATOR & EQUIPMENT CORP.
TRU-STEEL SHOT
510 S. Byrkit St., Mishawaka, Ind.

on the sporty convertibles and hardtops, particularly with the wide use of bright colors. This will reach a new high if the Skylark goes on the market.

Like other GM cars, Oldsmobile will have new body styling, probably more power, and extension of power steering, power brakes, and similar features.

Pontiac has tipped its hand promising extensive styling changes, but no V-8 this year. Pontiac and Chevrolet both want to bring out V-8's, but tooling and engineering have delayed the programs. Both Pontiac and Chevrolet are scheduled to replace cast iron pistons with aluminum.

Continental Touch—Nash introduced its 1952 models comparatively late this year and may do the same in 1953. Nash is apparently sold on the European design and Pinin Farina, the Italian designer. The European flair will probably be extended.

Packard is also sold on the "Continental" look and under a revised management will make every attempt to regain its quality reputation. Packard people also show more than a casual interest in sports cars, but 1953 may not be the year. Those who remember wire wheels with nostalgia just might be able to find them at Packard.

A major development at Hudson should be the introduction of the long-awaited light Hudson. It will have the step-down design of its bigger brothers with its low center of gravity.

Unknowns—Less is known about Studebaker's plans, but some styling and engineering improvements are in the cards. Studebaker is determined to strengthen its position as the biggest independent.

Kaiser-Frazer has let out little 1953 information. One possibility is a new hardtop. The Henry J may receive more emphasis if cost becomes a big factor in the 1953 market. Willys has a new car and should have styling features but probably no engine changes for next year's models.

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—Transportation—

LOCOMOTIVES:

May build 8000 locomotives to meet DPA goal . . . Plan more inland ships.

Nearly 8000 diesel-electric railway locomotives may be built before July 1, 1954, to meet a planned expansion goal of the Defense Production Administration.

Total goal for the period between Jan. 1, 1950, and mid-year 1954 is set at 15,500 locomotive units. This number includes all U. S. rail requirements, but not locomotives bought by defense agencies, or those for export or for industrial plant use.

By latest count, DPA has issued certificates for 7610 locomotives.

Inland Ships—Expansion goal for inland waterways vessels would allow construction to be started on more than 1900 craft of many types by Dec. 31, 1953. Included among vessels that may be built are cargo and passenger craft, tankers, towboats, tugboats, car ferries, lighters, and scows. Vessels for export or defense agency use and those to be employed only on Great Lakes aren't covered.

DPA has set the goal for strategic grades of chrysotile asbestos (both U. S. production and imported quantities) at 6000 short tons per year by Jan. 1, 1954. This would bring supplies up by nearly 4000 tons over 1951 supply.

Certificates for fast tax write-offs on about $4 million in facilities for making copper wire mill products are available from DPA. The agency set a goal of $15 million in capital investment, covering projects started on or after Jan. 1, 1951, to be completed not later than Dec. 31, 1953.

"Last time he tried that was in a gasoline storeroom."

a $ure $hot for $avings

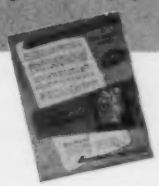
14 REASONS WHY PRECISION FINISHING COSTS LESS WITH THE NEW LIQUAMATTE

Mechanical equipment for producing close tolerance finishes has finally been perfected. "Hand" finishes are now produced mechanically in a matter of seconds in the new Liquamatte without the operating difficulties usually encountered in these processes. A simplified method of wet blasting, the new Liquamatte has 14 advanced design features that lower finishing costs.

Typical heat treated forging die, one half of which has been cleaned with the Liquamatte using a fine mesh Liquabrasive.

The Liquamatte is easier to start and more convenient to operate. Work can be handled faster with less effort and with far less down time. As a result, the Liquamatte uniformly removes scale and grinding lines at a new low cost. It cleans tools, dies and molds with greater efficiency while holding tolerances of .0001"

We believe the Liquamatte is the greatest advancement in close tolerance finishing in many years. We'd like the opportunity to prove it to you.



THE 14 WAYS *the Liquamatte simplifies wet blasting are described in Bulletin 23. Send for your copy today.*

American LIQUAMATTE WET BLASTING

WHEELABRATOR & EQUIPMENT CORP.

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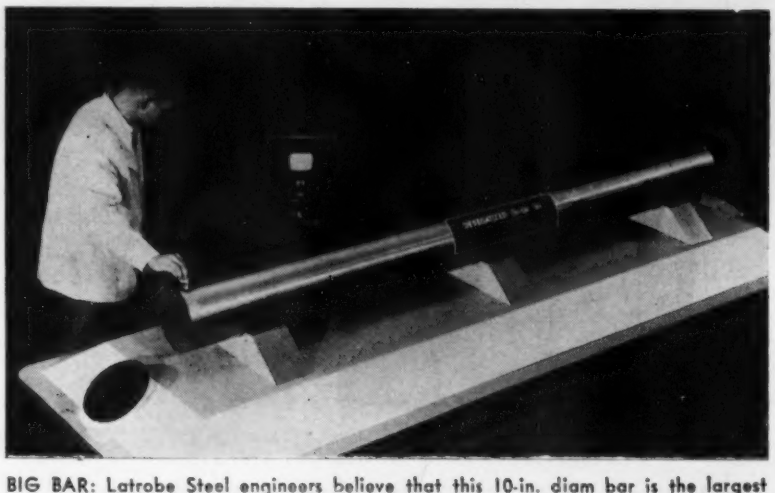
Cut Tool Steel Bars to Size—As Needed

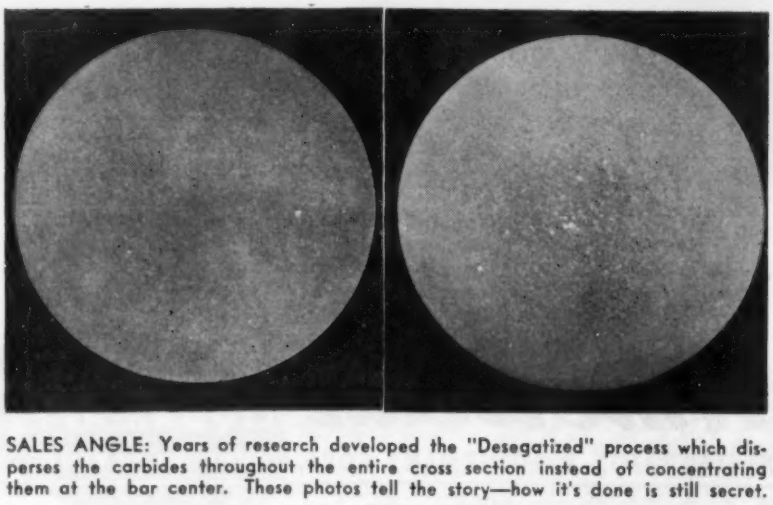
A new wrinkle in tool steel marketing will soon be tested by Latrobe Steel Co. The idea is to persuade buyers of high speed tool steels to stock long bars in various diameters and cut them to length as needed. This would reduce total inventories of manufacturers of milling cutters and similar tools who now keep stocks of forged rounds in various sizes. Instead of machining half an inch off a 4-in. round 4-in. high blank to make a 3½-in. high blank, the tool maker would cut a 3½-in. cylinder from bar stock.

Latrobe is optimistic about this approach because its secret "Desegatized" process steels can be made in sizes that are unusual in high speed tool steel. It claims in fact that the 10-in. bar shown here is the largest defect-free high speed tool steel bar ever made. Basis of the freedom from defects is said to be the secret chemical and mechanical process used by Latrobe to avoid segregation of carbides in the center of the billet.

The market for high speed tool steels in diameters above 6-in. is rather limited. Until now the "Desegatized" steels could not be made in large sizes; the limit has been 6-in. diameter. One reason for making the large bar is to prove that if segregation can be avoided in a 10-in. bar it obviously can be avoided in the smaller sizes which make up the bulk of the market.



BIG BAR: Latrobe Steel engineers believe that this 10-in. diam bar is the largest defect-free bar ever forged in high speed tool steel. Here it is being tested with a Sperry Reflectoscope which showed no flaws in the entire length.



SALES ANGLE: Years of research developed the "Desegatized" process which disperses the carbides throughout the entire cross section instead of concentrating them at the bar center. These photos tell the story—how it's done is still secret.

SALARIES:

Increases may be retroactive to time of boosts for wage workers.

Percentage increases for salaried employees, Salary Stabilization Board says, may be made retroactive to the date wage adjustments for workers under the same employer were authorized.

This provision in the newly-amended General Salary Stabilization Reg. 1 was inserted to maintain customary relationships between wages and salaries.

Changes Ordered—A number of changes in GSSR 1 were required by Defense Production Act amendments this year. Included are exemptions from coverage of certain engineers, architects, accountants, and small business firms. Jurisdictional changes transfererd to SSB control over all compensation of driver salesmen and some types of supervisors.

One policy alteration provides for adjustments for salaried personnel who work on a regularly extended workweek but are unable to qualify for additional pay. With prior government approval, an employer can compensate these employees for overtime provided they are not outside salesmen, company officers, executives, or administrative officers.

On-The-Job Accident Rate Rises

Manpower losses caused by on-the-job accidents in 1952 are going to equal 12 months of idleness for 140,000 men.

Source of this sobering prediction is the National Labor-Management Manpower Policy Committee, jointly headed by Arthur S. Fleming, assistant to Acting Defense Mobilizer John R. Steelman, and Robert C. Goodwin, executive director, Defense Manpower Administration, Labor Dept.

Pointing to a 12-pct increase in the work injury rate since June, 1950, the committee warns that casualties will continue to climb unless there is more emphasis on use of organized safety programs.

COSTS: Half-A-Loaf Pass-Throughs

Only costs of steel, copper, aluminum may be handed along . . . OPS considers thousands of applications for relief on wages, freight . . . How pass-through works—By G. H. Baker.

Industry dissatisfaction continues to mount this week over the government's "half-a-loaf" pricing order which permits manufacturers to pass on to their customers the higher prices paid for steel, copper, and aluminum, but which forces them to absorb their rising costs of labor, freight, and other materials.

Office of Price Stabilization, in issuing this week a revised industry earnings standards which authorize 100 pct pass-throughs of the higher costs of the three key metals, does not include in new ceiling prices now being calculated throughout metal fabricating industries today's heftier outlays for payrolls, freight, or materials other than steel, copper, and aluminum.

Not in Sight—Any relief from the cost-price squeezes resulting from higher costs other than these three materials is still over the horizon. OPS has "under consideration" applications from nearly 4000 companies and about 70 industries for higher prices resulting from these factors. The agency says no immediate relief is in sight.

At least a week—and possibly several weeks—may elapse before this much-needed relief is granted. But the inescapable fact that many manufacturers cannot long continue to absorb these higher costs may force the agency to speed issuance of the remainder of the relief order.

There is no retroactive feature to the revised earnings-standards order which permits pass-throughs of higher materials costs. This same condition probably will apply also to the possibly forthcoming orders dealing with other costs.

Since steel price rises were retroactive to July 26, aluminum increases to Aug. 4, and since the OPS pass-through order is not retroactive at all, metalworking industry must pay for this gap out of its pockets. Manufacturers are a little tardily returned to their pre-price-rise status with actually not a jot gained in the very substantial high cost departments of wages and transportation.

No Absorption—This week's order permits the higher prices paid for steel, copper, and aluminum to be passed along by manufacturers to other industrial customers or to the buying public. At the same time, no mark-up over the actual amounts of the increases is permitted. In effect, this restores the operating position of each subsequent fabricator to the same level which he would have experienced if it had not been necessary to increase the ceiling prices for these three metals. And that's all.

Manufacturers may elect, at their option, either of two general methods for calculating higher prices. A company may:

(1) Calculate its cost increases for each product separately, on the basis of cost increases incurred for the metals used in the product, or,

(2) Calculate an adjustment factor which will represent the average increase for a group of products.

As far as administration of the new earnings standards is concerned, each company is largely "on its own." The new order permits each firm to put its higher prices into effect immediately.

COMMAND CHANGE: Tighe E. Woods, new Office of Price Stablization boss (left), Roger L. Putnam, chief of economic stabilization agencies (center), and Ellis Arnall, retiring price head, meet the press on the White House steps after a conference with President Truman.

Oil Country Deliveries Extended

Firms holding authorized third quarter controlled material orders for oil country tubular goods now may call for delivery at any time up to Dec. 31, 1952, National Production Authority has ruled. This move (Dir. 4 to M-46, Dir. 2 to M-46A) makes it possible for the oil and gas industries in the U. S. and Canada to cash all third quarter tickets, NPA predicts.

Continued on Page 103

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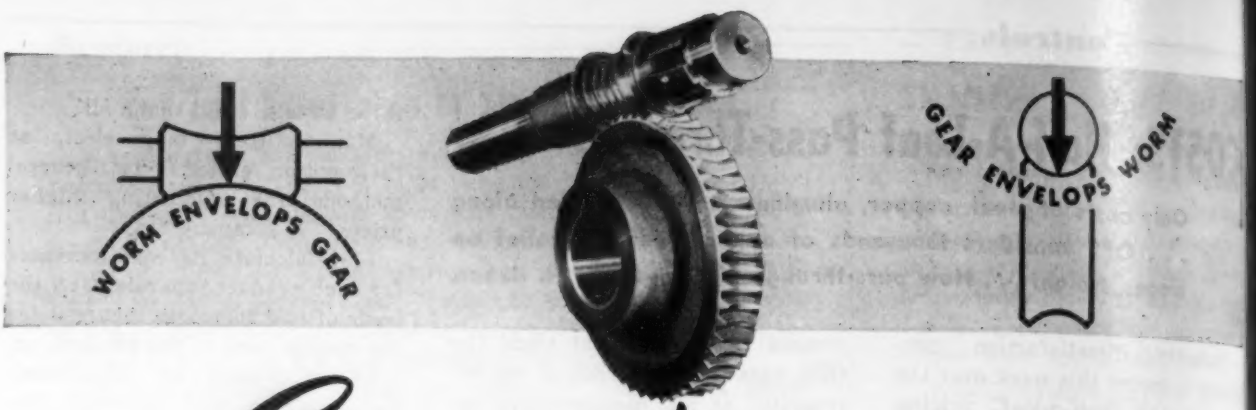

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And don't forget . . . . . . When you specify Cone-Drive double enveloping gears, you can use much smaller gear sets to carry a given load; you can save space and weight; and you get unparalleled smoothness. You get all of these simply because Cone-Drive Gears have (1) a greater contact area per tooth and (2) more teeth in contact.

What to do . . . . . . ***Write, phone or wire today for Catalog No. 700—or better yet, ask for specifications of the STANDARD Cone-Drive gear set most nearly meeting your power and ratio requirements. They are available in ratings from fractional to hundreds of horsepower and in ratios from 5/1 to 70/1.***

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Pricesetters Shift Emphasis

Weakened forces of the Government's price-setting agency pointed toward a campaign emphasizing controls over productive materials and equipment, rather than consumer goods, when they suspended restrictions last week on such items as radios and television sets.

Below-ceiling prices prevailed in the case of those items on which controls were suspended or actually lifted, as was true of display fixtures, outdoor signs, and others. Futility of maintaining a bulkhead against elements that were not trying to break free became clear to Office of Price Stabilization, and the agency announced a program calling for concentration of its limited resources "where they can do the most good."

As part of this projected plan, OPS expects to keep allocation of its personnel under continuous review and, as the need arises, to reallocate strength "boldly and promptly." Tests for those restrictions to be continued in effect will be "fairness and equity," or requirements of the controls law.

Standing By—OPS also made a promise of a "most careful watch" over economic conditions and of quick action if further emergencies arise. This statement is viewed as a warnng that those controls suspended might be reimposed if prices of consumer goods rise.

Most far-reaching element of the OPS program is the proposal that a group be named to prepare drafts of basic controls legislation, a regulatory formula, and outlines of organization and procedure that could be employed if there is a further threat of inflation.

Industry Controls This Week

Columbium—Amend., Sched. 5, M-80 permits sale and use of certain columbium-bearing stainless steel shapes and forms that have been in inventories of producers and distributors for 6 months or longer.

Zirconium—Amend. 2, M-80 increases amount of zirconium that can be used in steel production without being recorded on monthly melt-sheet report from 200 lb to 15 tons.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Repair parts for governors & turbines, 25300, $415,348, Westinghouse Electric Corp., Philadelphia.

Coil & switch assemblies for electric motors, 4360, $57,737, General Motors Corp., Detroit, *R. C. Campbell.*

Repair parts for electric motors, 41127, $61,691, Cutler Hammer, Inc., Milwaukee.

Repair parts for diesel engines, 174959, $124,915, General Motors Corp., Detroit, *J. E. McKenna.*

Repair parts for diesel engines, 31445, $45,825, General Motors Corp., *W. O. Nelson.*

Metal parts for booster, M21A4, 5700 units, $560,025, Detroit Brass & Malleable Works, Detroit.

Metal parts for booster, M21A4, 15500 units, $1,476,375, Detroit Brass & Malleable Works, Detroit.

Metal parts for booster, M21A4, 14160, $1,430,160, Grand Rapids Hardware Co., Grand Rapids.

Metal parts for primer, percussion, M60, 7500 units, $232,125, Calumet & Hecla Consolidated Copper Co., Detroit.

Rocket assemblies, 2650000, $5,007,000 General Motors Corp., Detroit, *A. F. Goosen.*

Shell, HE, M71, 90MM, 200000, $1,368,000, Canadian Commercial Corp., Ottawa, Canada.

Metal parts for primer, percussion, M28B2, 12000 units, $291,720, Calumet & Hecla Consolidated Copper Co., Detroit.

Galvanometer, blasting, 6087 sets, $81,870, Demaco, Inc., Detroit.

Automotive spare parts, 6690, $45,031, International Harvester Co., Detroit.

Automotive spare parts, 8000, $109,440, Universal Prods. Co., Inc., Dearborn.

Fin assy M103A1, 156375, $179,205, Michigan Metal Products Co., Battle Creek, Mich.

Links, metallic belt, 20MM, M10, 7000000, $312,900, L. A. Young Spring & Wire Corp., Detroit.

Fin assy, AN-M114A1, 20000, $121,540, Saginaw Industries Co., Saginaw, Mich.

Metal parts for shell, HE, 90MM, M71, 640000, $3,040,000, Kelsey-Hayes Wheel Co., Detroit.

Automotive spare parts, 10758, $322,626, Kendall Machine & Tool Co., Battle Creek, Mich.

Automotive spare parts, 1584, $65,821, Prestyle Mfg. Co., Detroit.

Trucks, fork, lift, 145, $537,232, Clark Equipt. Co., Buchanan, Mich.

Trucks, industrial crane, 350, $2,669,782, Federal Motor Truck Co., Detroit.

Trucks, crane, warehouse, electric, 14, $170,714, The Baker-Raulang Co., Cleveland.

Tractors, warehouse, gasoline, 47, $169,917, Clark Equipt. Co., Buchanan, Mich.

1500 VA inverters, 435 ea, $201,718, Jack & Heintz, Inc., Cleveland.

Airplanes, 55, 1 lot, $3,798,865, Beech Aircraft Corp., Wichita, Kansas.

Spares for components, 667 ea, $856,020, Radio Corp. of America, Camden, N. J.

Hemisphere sights, 65, $2,577,388, Eastman Kodak Co., Rochester, N. Y.

2500 BA inverters, 2000 ea, $580,290, Landers, Frary & Clark, New Britain, Conn.

Wheel & brake assy, $140,075, The Goodyear Tire & Rubber Co., Akron, Ohio.

Air speed indicator, 5160, $1,060,147, Kollsman Instru. Corp., Elmhurst, N. Y.

Wheel & brake assy, 1116, $1,347,557, The Goodyear Tire & Rubber Co., Akron, Ohio.

Compressor, 109 ea, spare parts, 220 ea, $323,185, Worthington Corp., Cincinnati.

Aircraft camera, 3218 ea, $830,944, The Houston-Fearless Corp., Los Angeles.

Cradle, pintle and ammo box holder assy, 9700 ea, $571,954, James Counningham, Son & Co., Inc., Rochester.

Spare parts for materials handling equipt., var, $38,502, Clark Equipt. Co., Battle Creek, Mich.

Replacement & spare assemblies, $200,000, American Floor Surfacing Co., Toledo.

Spare parts, $200,000, Western Electric Co., New York.

Replacement and spare assemblies, $45,000, General Electric Co., Washington.

Precision potentio-meters, 800 ea, $86,187, Fairchild Camera & Instru. Corp., Jamaica, N. Y.

Replacement & spare assemblies, $40,000, Arma Corp., Brooklyn, N. Y.

Bomb, demolition, T54E2, 100000 ea, $8,000,000, Walsh Construction Co., New York.

Lighter, fuze, 1184130, $330,372, Free Sewing Machine Co., Rockford, Ill.

Firing device, pressure release type M5, 75000, $42,960, Free Sewing Machine Co., Rockford, Ill.

Automotive spare parts, 10941, $84,193, Diamond T Motor Co., Chicago.

Final drive & support assy, 1820, $1,304,239, Brad Foote Gear Works, Chicago.

Primer, percussion M54, MPTS, 11013000, $57,818, Deringer Metallurgical Corp., Ill.

Fuze, PD, M82A1, MPTS, 781000, $716,317, McGraw Electric Co., Elgin, Ill.

Replenishment of tools, 1200 ea, $89,040, Vally Forge & Car Co., McGrath & Co., St. Paul.

Replenishment of tools, 5500 ea, $396,000, Joseph Weidenhoff, Inc., Chicago.

Replenishment of tools, 893 ea, $25,834, Overhead Conveyer Co., Detroit.

Replenishment of motor vehicle parts, 200000 ea, $25,200, Clark Cable Corp., Cleveland.

Replenishment of motor vehicle parts, 5800 ea, $25,618, Triplex Corp. of America, Pueblo, Colo.

Replenishment of motor vehicle parts, 1400 ea, $152,460, Diamond T Motor Car Co., Chicago.

Replenishment of tank & combat vehicle parts, 500 ea, $30,600, Clark Cable Corp., Cleveland.

Replenishment of motor vehicle parts, 3200 ea, $80,222, Ainsworth Mfg. Corp., Detroit.

Replenishment of hardware, 13900 ea, $61,577, Purolator Products, Inc., Rahway, N. J.

Replenishment of tools, 6 ea, 37,200, United Mfg. Co., Hamden, Conn.

Replenishment of tank & combat vehicle parts, 5000 ea, $134,350, Libbey, Owens, Ford Glass Co., Toledo.

Replenishment of tools, 1200 ea, $40,800, Skarda, Inc., El Monte, Calif.

Replenishment of small arms parts, 3120 ea, $31,528 Dual Remote Control Co., Inc., Garden City, Mich.

Replenishment of small arms parts, 15000 ea, $31,200, DM Tool & Mfg. Co., Dearborn.

Spare parts sets dolly trailer, converter 6 Ton, 2895 units, $4,248,540, Fruehauf Trailer Co., Detroit.

Replenishment of tank & combat vehicle parts, 1400 ea, $147,000, Machine Tool & Die Co., Detroit.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Headquarters Air Materiel Command, Dayton.

Jack hand hydraulic, 1039 ea, 53-5021Q, Sept. 8.
Tester inverter bench, 95 ea, 53-5037Q, Sept, 8.

Yards & Docks Supply Office, Porthaeneme, Calif.

Repair parts, Mower Power & Truck Div., International Harvester Co., 617 itm, 321-53, Sept. 11.

Naval Ordnance Plant, Indianapolis.

Assy, thermal motor, 1000 ea, 1909B, Sept. 8.

Commanding Officer, Picatinny Arsenal, Dover, N. J.

Ammo container, 40000 ea, 29B, Sept. 5.

Navy Purchasing Office, Washington, D. C.

Machine, strapping and boxing, 438, 6667B, Sept. 23.
Hoists, 230, 669B, Sept. 9.
Vises, 730, 6670B, Sept. 9.
Screwdriver, 301760, 664B, Sept. 22.
Anvils, blacksmiths, 200, 93Q, Sept. 10.

Naval shipyard, Portsmouth, N. H.

Connector, receptacle, 480 ea, PR-1415-52, Sept. 15.

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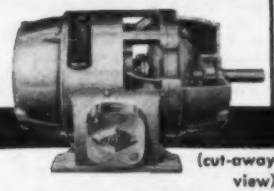

(cut-away view)

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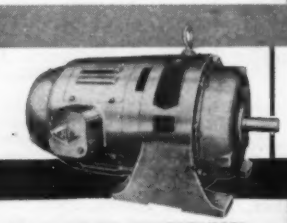

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This Fluid-Shaft motor and gear reducer combination converts the motor's conventional high speed into a slow speed, smooth starting, compact unit. Ideal for car pullers, conveyors, dryers, etc.

MAGNETIC BRAKE

The only brake that permits the use of TWO output shafts per motor. *When desired, the motor shaft can be extended right through!* Only 6 major parts... no levers or linkage... self adjusting . . . half usual length!

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Industrial Briefs

Contract Awarded—THE BUNCHER CO., Pittsburgh, was awarded a contract by the U. S. Navy Dept. for the clearing of the islands of Kiska and Tanaga in the Aleutians.

Hydraulic Press — Canada's largest hydraulic press for the conversion of scrap steel was unveiled in the Cote St. Paul yards of LOUDEE STEEL CORP., when an automobile, with tires, glass and upholstery removed, was compressed into a bundle less than 24 in. in 55 seconds.

Earnings—U. S. STEEL CORP. earnings for the second quarter amounted to $22,218,922.

Branch Office—THE DENISON ENGINEERING CO. has opened a branch office at 565 No. Prairie St., Hawthorne, Calif.

Expansion—CHAPIN & FAGIN INC., Buffalo, has again expanded their facilities by installing a Logemann Press in their yards. It is said to be the largest hydraulic scrap iron baler in New York State.

Fellowships Awarded — BATTELLE INSTITUTE, Columbus, Ohio, has awarded two fellowships in chemical engineering for the 1952-53 school year. Carl S. Schlea and David G. Stephan, are the recipients and they are candidates for the degree of Doctor of Philosophy at Ohio State University.

Installation — A new car type heat treating furnace is being installed by RUST FURNACE CO., at The National Roll & Foundry Co., Avonmore, Pa.

Complete Operation Unit—Chemical Plants Div., BLAW-KNOX CO., has expanded and reorganized its Tulsa, Okla., office into a complete operating unit to be known as the western headquarters, and has appointed F. Drake Parker manager.

Purchased—THE PURDY CO. has bought the scrap iron yards of Hickman, Williams & Co., Madison, Ill.

Something New—A new firm formed for the production and sale of a new densifier, which makes possible high heat-conductive concrete for radiant heating, is LEE-DON, INC., Harmarville, Pa.

Property Leased—AMERICAN PIPE & STEEL CORP. has leased the 390-acre Ryan Airport property, located just outside the city limits of Hemet, Calif., and owned by San Barnardino County for the erection of a branch plant.

New Building—A new building, which is attached to the original plant, has been completely integrated into the operations of WAPAKONETA MACHINE CO., Wapakoneta, Ohio. It will increase production capacity by approximately 50 pct.

Moves — FANNER METAL PRODUCTS CO., Coleman-Peterson Div., will move next month into modernized and enlarged plant recently purchased from Air-Maze Corp., Cleveland.

Construction Started — SYLVANIA ELECTRIC PRODUCTS INC., has begun construction work on a 40,000-sq ft facility near Mountain View, Calif., that will house a new group of product development laboratories of the Electronics Div.

Enters Field—SERVOTROL CO., Chicago, under license agreement with Technology Instrument Corp., have entered into the field of precision potentiometers and servo components.

Average Earnings—DEPT. OF COMMERCE reports that average earnings in 1951 amounted to $1,584 for every man, woman and child in the U. S.

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Complete facilities are available for further fabrication such as cutting, swaging, bending, annealing, testing, etc.

If you are equipped to do your own fabricating, you will find Revere Electric Welded Steel Tubing has uniform properties and can be readily formed for varied applications.

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Hopes for Decontrol Rise Again

Removal of copper, aluminum from critical list bring new talk of removing auto output curbs . . . No action would be possible until steel supply gap is filled—*By R. D. Raddant.*

It has been some time since auto makers felt the pinch of copper and aluminum shortages. Improving supply sources and the steel strike took care of that. Nevertheless, the lifting of both metals from the critical list was good news.

Assured of a plentiful supply of these metals, the industry began to look around to a possible lifting of production quotas in 1953. Steel remains critical and will stay that way for some time, particularly in certain products. It is still only a question of time before the gap left by the steel strike is closed.

MEETING: Walter Reuther, United Automobile Workers—CIO president, and Governor Adlai E. Stevenson, Democratic presidential candidate, conferring at the executive mansion last week on the governor's Detroit Labor Day speech.

Push For Decontrol—When that comes, providing no new crisis arises, there will be plenty of pressure from Detroit for a return to the free market. The industry felt it was on the verge of this before the steel strike intervened and these hopes have been revived with the strengthening copper and aluminum supply.

Previously these two metals had been the big stumbling block in the path of decontrol. Then, at the time when copper and aluminum supplies were beginning to improve, the steel strike hit. The result was a complete reversal of the situation. Steel became the weak link with copper and aluminum holding their own.

One question arises, however. How much of this abundance can be traced to the shutdowns of manufacturing plants during the steel strike? Probably some of the good supply is artificial and may be wiped out by a return to production, but buyers here agree that the shortage has finally been overcome and overcome on what should be a permanent basis.

Is Brightwork Easier?—Increased availability of copper caused an immediate flurry of speculation that things looked brighter for new brightwork.

As a matter of fact, one Detroit paper splashed this banner across six columns of the front page: "Auto Chrome Crisis Eased." Don't bet too much on it.

Regardless of how plentiful copper is, good and lasting chrome depends on nickel. There is little optimism that nickel will be off the critical list for a long time to come.

Before the Korean crisis snapped up most of the nickel to be used for the jet engine program, automotive brightwork consisted of a layer of copper, then nickel, with the chrome on top the nickel. This nickel sheathing was the big factor in preventing corrosion from creeping through to the chrome.

Now very little chrome is protected by nickel and substitutes have not been satisfactory. With more copper available, manufacturers will use more copper in chrome plating. This will help some, but thicker copper alone will never do the job nickel did.

MG Blues—American auto producers are listening to a disturbing little sound that just won't go away. It may be getting so loud that something will have to be done.

What's making the noise? It's that pesky British MG that has buzzed its way to the top of the list of automotive imports. The sporty two seater gained 831 American registrations during June, nearly double the sales of the Hillman, next car on the list. In the first 6 months of this year, 3232 MG's reached American buyers.

It's not the immediate threat to the market that is irritating to American producers. What bothers them is that MG sales indicate a market for that type of car that

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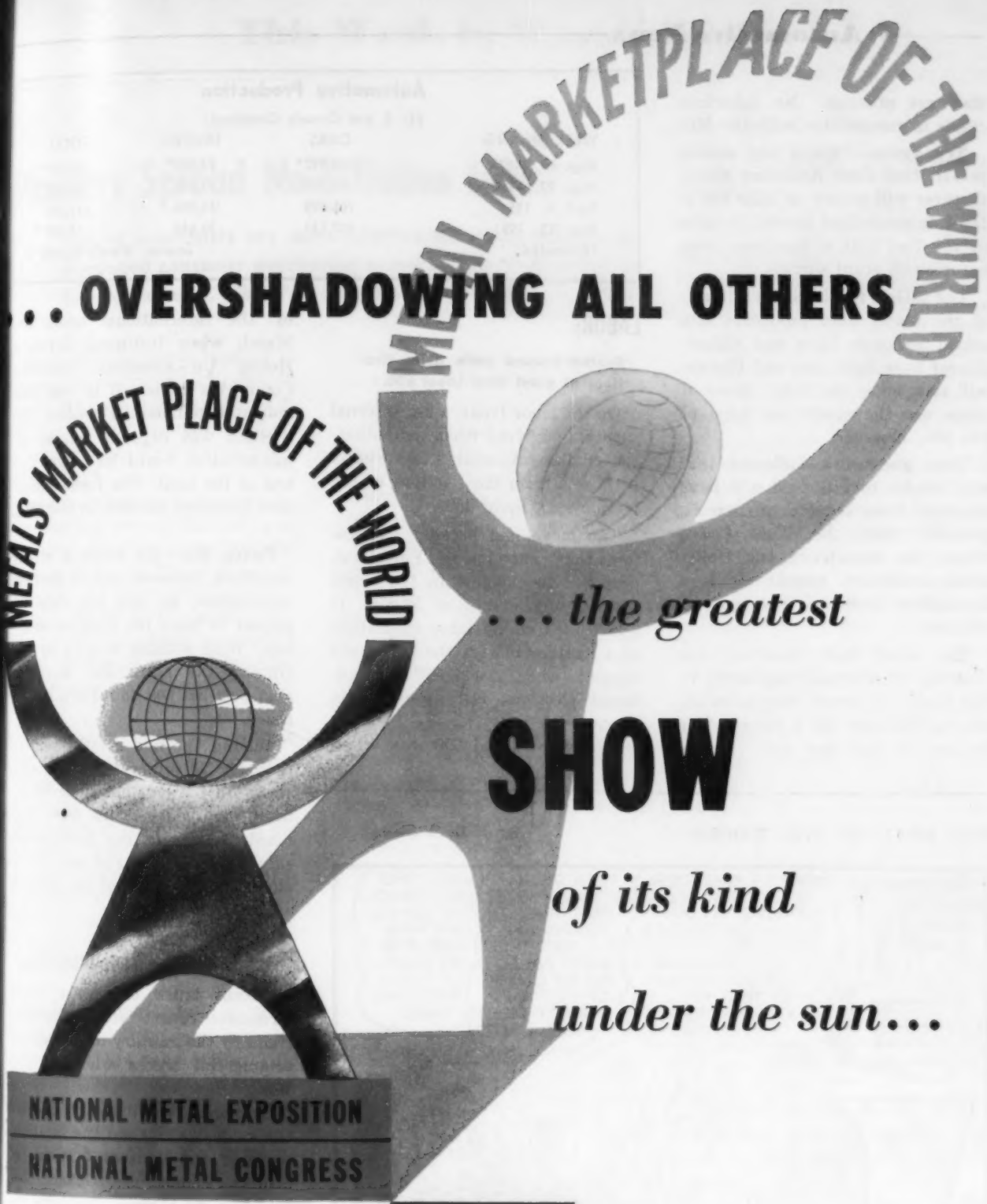

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NATIONAL METAL EXPOSITION

NATIONAL METAL CONGRESS

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OCTOBER 20-24 • PHILADELPHIA, PA.

they are missing. No American car is in competition with the MG.

Try Again—This is why stories persist that some American manufacturer will sooner or later try to tap this specialized market in spite of the fact that it has been tried before with scant success.

The MG is not likely to stir any of the major auto producers into action although Nash and Kaiser-Frazer have light cars and Hudson will soon enter the field. None of these are the sports car type of the MG, however.

Most guesswork indicates that any entries to this field will have to come from outside of Detroit, possibly from the West Coast. There the atmosphere and Hollywood traditions appear to lend themselves more to this type of venture.

The small cars, however, are showing considerable popularity in the East too, where they have attracted interest as a second car because of their low cost.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Aug. 30, 1952	100,992*	24,009*	125,001*
Aug. 23, 1952	88,755	31,385	120,140
Sept. 1, 1951	106,094	31,285	137,379
Aug. 25, 1951	107,131	31,666	138,797

*Estimated

Source: *Ward's Reports*

LABOR:

Reuther-backed slate quits elections at giant Ford Local 600.

On the labor front, a big internal surprise occurred when a Reuther-backed slate of candidates abruptly withdrew from the elections of the faction-split Local 600.

The move had broader implications than control of the Ford local, probably the largest in the world with a membership of 53,000. It was looked on by labor specialists as a Reuther bid for the big local's support when the UAW international elections roll around next May.

In review, Local 600 was seized by the international union last March when testimony before a House Un-American Activities Committee indicated it was communist dominated. President Carl Stellato was deposed and an administrative board took over control of the local. The former president appeared doomed to obscurity.

Peace Bid—He made a strong comeback, however, and as elections approached, he and his slate appeared to have the election in the bag. With nothing to gain by continuing the fight, Mr. Reuther's next best bet was to make a bid for peace.

During the five months seizure, probably 20 minor Local 600 officers were purged, but none of the top four office-holders were banished. However, they have reportedly seen the light and are seeking right-wing support at the expense of the leftist faction.

THE BULL OF THE WOODS By J. R. Williams

AWP! I SHUDDER WITH HORROR! IMAGINE A MAN DOZIN' ON DEATH'S SHOULDER! WHY, IF THAT MACHINE YANKED HIM IN-TO THAT PIT... OW, A PERFECT GUILLOTINE!
HE'S BEEN DOZIN' THERE FOR TWENTY YEARS AN' I'LL BET THIS BIRD WILL BE TH' CAUSE OF PUTTIN' A SAFETY DE-VICE ON IT!
WELL, THE ONLY NEED THE OTHER GUY HAS FOR IT IS TO SHUT UP SUCH BIRDS AS THIS!
9-5 J.R.WILLIAMS
THE MEDDLER
Copr. 1952 by NEA Service, Inc. T. M. Reg. U. S. Pat. Off.

Army Boosts Civilian Truck Use

Recent truck orders by Army Ordnance reflect an encouraging trend by the military to use regular commercial trucks wherever possible.

Ordnance traditionally ordered trucks drawn to rigid specifications to meet the unusual demands of field and combat use. Chances are, however, that these expensive vehicles ended up doing conventional hauling that could be done as easily by a regular commercial vehicle. New orders reflect that this costly procedure is on the wane.

Dodge announced a recent order for 3439 regular commercial trucks placed by Ordnance. Included in the $4,750,000 order were ½-ton, 2-ton, and 4-wheel-drive power wagons.

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Planners Spread No-Inflation Idea

Capitol economists say more inflation not likely considering diminished consumer purchasing power . . . Draft may pick up deferred men . . . Where's war output Peak?—By G. H. Baker.

The economic forces tending to generate a new round of inflation are slowly but surely being braked by the public's diminished purchasing power, Washington planners believe.

New government estimates on the spending and saving habits of American families show that the average U. S. city family is spending far less—proportionately—than it did 12 to 18 months ago. (Is this Washington's conception of an ideal way to beat inflation by paring a manufacturer's market?)

Immediately after the Korean war started, the nation went on a buying spree in anticipation of shortages that failed to arrive. There were sharp increases in demand for such products as automobiles, tires, coffee, refrigerators, and TV receivers. But manufacturers and producers were able to keep up with demand, and there were no real scarcities.

No More Inflation?—But "high velocity" inflation has run its course—for the time being. This is the firm belief of top Washington economists these days. And they say they are not overlooking the factors—such as higher wages and prices in steel, copper, and aluminum—tending to notch up the speed of national spending.

What this means is a series of cost-price squeezes at many levels of distribution. The new government ruling which permits business and industry to pass on its higher cost of materials may mean nothing more to some manufacturers than an abstract piece of reading matter if the public is going to balk at paying higher prices for finished goods.

Safe No Longer—New demands upon industry's draft-age employees are now in the making. Unless the military manpower situation improves very soon, next summer will see the drafting of fathers, 4-Fs, and other deferred groups.

Army's personnel problem is being worsened by the constant release of Korean veterans. The first draftees of the Korean war are now winding up their 2-year hitches and are lining up for discharge buttons. Few of them are electing to re-enlist on a voluntary basis.

Unless this trend is reversed in the coming months, Selective Service officials will move reluctantly to tap nearly all those now rated as "deferred" with their local draft boards.

Still With Us?—Judging by the statements of Washington production officials, the "peak" of defense output is beginning to take on all the aspects of a first-class mirage.

"The Hoover Commission says it's more efficient this way."

The 54-day steel strike, cutting temporarily but heavily as it did into armament schedules, necessarily is resulting in revised production estimates. Even taking this set-back fully into consideration, however, the following statements by government officials point up the will-o-the-wisp quality that the "peak" goal is beginning to assume:

"Peak deliveries will be reached next spring." (September, 1951.)

"Defense production will be over the hump in mid-1953." (March, 1952.)

"If there were deliveries on outstanding orders, plus the unplaced orders at the current rates of delivery, we should still be 3 years away from the completion of the program that is to make us even minimally secure." (August, 1952.)

"Come Hither"—Attractive bait—in the form of tax concessions—is to be offered industries as an incentive for locating their plants in New England, if present Washington plans progress from the "talking" stage to the "action" stage.

Fast writeoff of facilities would be granted, under terms of the proposal, to owners of new plants in New England's mill cities. Small metalworking plants are particularly sought.

Crisis Strikes—Steady erosion in recent years of its textile industry has reduced many Massachusetts cities and towns to a "crisis level."

Unemployment is still at high levels, despite efforts of New England congressmen to divert defense contracts to the area. Rep. Herter, R., Mass., says the Administration's policy of preferential treatment to "distress areas" has brought little relief to Massachusetts in general, and none at all to the textile centers of Lawrence, Lowell, Fall River, and New Bedford.

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STOCKPILE: Needs Under Review

Muntions Board reconsidering defense requirements . . . Substitute materials ease supplies of some items . . . Value of objectives cut $374 milion through restudy—By *R. M. Stroupe.*

Industry and science are making it possible for the Pentagon's Munitions Board to reconsider the need for stockpiling a number of currently critical items, but additional studies must be made before the agency is ready to name new substitute materials.

Some substitutes previously announced have received much public attention. Kapok, for example, was removed from the stockpile list because fiberglas was found to be a buoyant, long-wearing replacement. Synthetic corundum is considered the equal of natural corundum, except for lens-grinding purposes, and domestic ground talc may be used instead of block talc.

Review of stockpile objectives for 27 of the 75 materials still on the Munitions Board critical list was undertaken during the first half of this year.

Goals Changed—Five objectives were increased, seven decreased, three were unchanged, and others are being given "final consideration." A significant result was reduction in total value of stockpile objectives by about $374 million.

Reporting to Congress on its work for the first 6 months of 1952, the board said antimony, cadmium, lead, zinc, and rubber are now in more plentiful supply. Zinc is one of the items diverted from the stockpile to meet immediate needs during the half-year. Cobalt, copper, fluorspar, nickel, and tungsten were given the same treatment.

Rate of diversion was declining sharply during the period studied, the board discloses. It is not anticipated that any considerable quantity of the materials named will be sidetracked during the rest of the year to fill current production requirements for the defense program.

Value—Aggregate value of all stockpile objectives now is placed at $7.753 billion, but no final completion date is named. Item deliveries in the half-year ended June 30 amounted to $480 million, a gain from the $357 million worth of materials added in the last half of 1951.

At the end of June, materials in the stockpile were valued at $3.565 billion, or less than half the total objective. Items under contract for delivery are expected to cost $1.9 billion, though buying commitments declined in the half-year.

Primary reason for this drop is the large amount of strategic materials claimed by defense and defense-supporting agencies and by the Atomic Energy Commission.

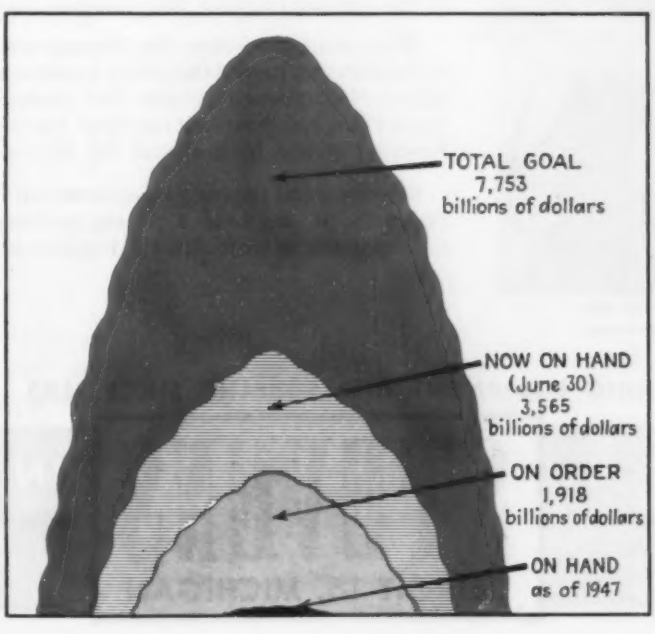
Supply expansion programs set up to provide greater stocks of scarce materials are aided by financing provisions of the Defense Production Act. A recent count showed $570 million in borrowing authority has been allocated by the government for strategic metals and minerals expansion. Tax amortization has been allowed for 153 metal mining projects, valued at $625 million.

Straightening It Out—Tone of the board's comment on inter-agency activities connected with channeling short-supply materials to essential defense programs is not flattering. Groups dealing with this work are the Defense Materials Operating Committee and Defense Materials Policy Committee.

A 10-member inter-agency committee with a Munitions Board representative, the first group has the task of setting acquisition rates for stockpile items. It also decides whether military and essential civilian production requires utilization of portions of the materials bought. The Policy Committee advises the Operating Committee. Munitions Board contends that channeling of materials in accordance with priorities thus determined resulted in curtailment and delays in the delivery of some items to the stockpile.

One major task for the board is locating of adequate warehouse space for materials bought. Because warehousing also is a headache for industry, the board has been unable to lease the storage areas needed. There was interest at one time, in Munitions Board and other agencies, in use of caves for storage facilities, but this possibility created additional unsolved problems.

U. S. Critical Materials Stockpile Growing



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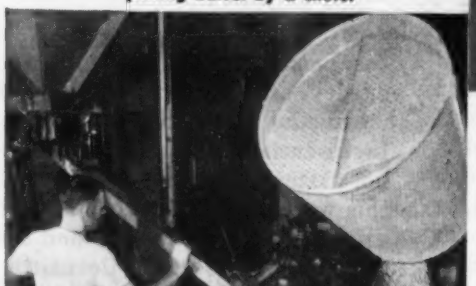
Unplated BB shot is loaded into plating barrel by a chute.



After being plated the shot is dumped by the revolving barrel.

This tray receives the plated shot and funnels it into a conveyor.

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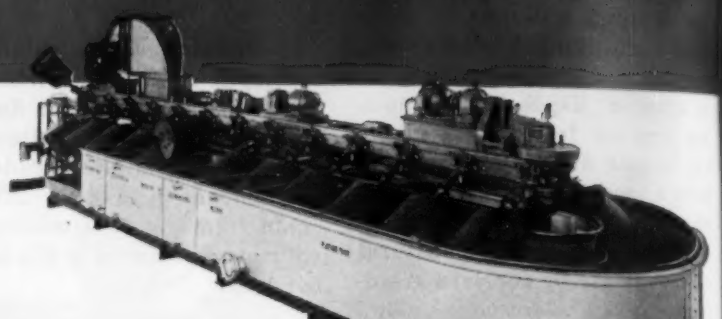

Stevens Full Automatic Barrel-Type Plating Machine similar to the one in use at Daisy.

Plating air rifle BB ammunition is an unusual application for a huge plating machine, but the Stevens unit at Daisy Manufacturing Company, Plymouth, Michigan, is bringing new profits and efficiency to this operation. Formerly barrel plating was used to give the pellets their copper coating and it was an unwieldy and laborious process.

But with their Stevens machine Daisy has been able to install an ingenious conveyor system that requires no manual handling from the time the pellets are formed until they are ready for shipping. The pellets are transferred from the shaping machines to a chute and carried by conveyor to the Stevens machine. The machine does the rest.

After plating the shot, the Stevens unit empties it into another chute and a conveyor carries the pellets to automatic packaging machines. Daisy's plating department estimates that production is one and one-half times greater and man-hours are one-third less since installation of their materials handling system built around the Stevens Barrel-Type plating machine.

Stevens metal finishing equipment can bring the same benefits to your operation. If you have a plating problem, call in your nearby Stevens representative or write direct to Frederic B. Stevens, Inc., Detroit 16, Mich.

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Shipbuilders Win Another Round

Coast yards hail exemption from policy 4 . . . New victory in fight for work . . . Steelman orders contracts to areas with surpluses of yard facilities, labor skills—*By T. M. Rohan.*

West Coast shipbuilders chalked up a new victory in their uphill fight for work last week when shipbuilding was exempted from defense manpower policy 4 which has cost them several jobs in the past. Under the policy, construction jobs could be assigned to yards designated as having a labor surplus even though their bid was higher. In some cases the surplus has been in entirely different trades.

Coast civic, business and especially shipbuilding representatives have long decried the policy. Last week, however, Defense Mobilizer Steelman ordered the Department of Defense to "take all necessary steps consistent with sound nationwide distribution of shipbuilding contracts" to place contracts with firms in areas where a surplus of shipbuilding and labor skills and facilities are available.

Shipyard officials were elated since it will undoubtedly permit them to use extensive facilities more fully and labor leaders were similarly pleased since more shipyard mechanics will be able to return to their traditional trade.

Washington's action came as a result of recommendations of a fact-finding panel of the Surplus Manpower Committee which also reported shipbuilding is a "distressed industry."

Foreign Steel — Substantial quantities of foreign steel are coming into the Pacific Northwest through Canada in the wake of the steel strike.

Over 300 tons of structural shapes from Luxemburg were sold at $6 per hundredweight plus duty. And prices from Continental Europe have dropped $20 per ton in the last month, being quoted now as low as $5.50 per hundredweight c.i.f. out of Vancouver, B. C. British prices are quoted at about $7.50 or $8 per hundredweight and Japanese plate has softened to $6 plus duty.

Fabricators are running at a reduced rate and do not see full production resumption for some time. Some suppliers are being hurt by cancellations attributable to lack of steel for other components. Warehouse stocks are spotty, especially on structural sections and even marginal items are rapidly diminishing.

Teach the Teachers — U. S. Steel's Columbia-Geneva Div. this week is hosting 12 top western college professors, showing them the inner workings of the trade. The summer vacationing teachers will be closeted with top Columbia-Geneva management men in the fields of their choice and also tour the Pittsburg, Calif., and Geneva, Utah, operations.

The press was barred from meetings even on an "off-the-record" basis, indicating the steel officials intend to lay cards on the table, not just have a goodwill session. Although similar sessions have been conducted by Standard Oil of California and General Motors at Detroit, this is the first ever held by U. S. Steel and believed to be the first in the steel industry.

Boy . . . has he got what it takes!

Aluminum Corrosion—The propensity of aluminum for corroding when immersed in salt water with steel will cost the American President Lines of San Francisco about $200,000 on two ships, the Cleveland and Wilson. Where aluminum is riveted to steel by steel rivets and exposed to salt water corrosion has set in over the past 2 years.

On other ships, however, where the contact points have been protected from salt water, no corrosion has taken place. By greater protection for saturation, use of aluminum rivets and spraying of steel supports with molten aluminum, shipyard engineers hope to end the problem.

Kaiser-Frazer Loan — Kaiser last week was ready to sink another $25 million in Kaiser-Frazer to keep the struggling automobile firm going. The somewhat complicated deal involved: (1) A loan to the parent Henry J. Kaiser Co. of $22 million from a group of bankers; (2) purchase of $20 million government bonds with the loan; (3) exchange bonds for comparable value of stock in Kaiser affiliates which had been pledged by Henry J. Kaiser Co. as security on Kaiser-Frazer debt to Reconstruction Finance Corp.

More Petroleum — Western petroleum consumption is rising so fast that pipelines such as Standard Oil's 330-mile line from Salt Lake City to Boise, Idaho, only 2 years ago are now inadequate.

Standard last week announced it was building a duplicate 8-in. line at a cost of $8 million to raise transportation capacity from 22,000 bbl to 39,500 bbl. More pumps boost this to 45,000 bbl daily.

Machine Tool High Spots

"What About Our Labor, Freight Costs?"

Tool makers not gleeful at OPS pass-through of metal costs order . . . It says nothing about important labor, transportation costs . . . Nuisance regulation out—*By E. C. Beaudet.*

Machine tool builders were far from elated over the government's pricing order issued last week which permits them to pass on 100 pct of their increased costs of steel, aluminum and copper to their customers.

What had been hoped for and what there had been considerable discussion in Washington about last week was the authority to pass on growing costs of labor, transportation and other materials they buy.

Other Costs — While this may still be in the cards, the order as it stands now makes no provision for passing on these increased costs. One builder believes the present over-riding regulation puts the industry back in the same position it occupied prior to the steel strike.

The big problem facing machine tool builders is the higher costs they have had to or will have to pay for labor. Ever since the steel wage settlement there has been increasing pressure exerted to boost wages throughout the industry. Every contract being negotiated or to be negotiated is subject to the pressure of the steel labor contract with its substantial wage increases.

Match to Ceilings—One annoying regulation issued recently by the government requires that manufacturers billing or quoting to various government services list their quoted price and also the ceiling price for each particular item. The provision is retroactive to July 26, 1952—significantly the date steel prices went up.

On invoices formerly tendered all that was required was the manufacturer to certify the quoted price was within the ceiling price regulation.

No Simple Chore — While the listing of ceiling prices seem simple enough in theory, computing them is an extremely difficult matter.

Some builders claim compliance would be a major accounting task. The wide variety of products to be quoted on, computing of base period prices and costs, etc., would be a time consuming and costly job.

Since a good many machine tools are being sold below ceiling price limits, there's no necessity to compute ceiling prices specified for each item. Builders don't care what the actual ceiling price is as long as they are under it.

Don't Mean Us—It's obvious the regulation which applies to all manufacturers was not written with the machine tool industry in mind.

Builders are expected to ignore the regulation as unworkable, which it is. However, one builder recently has had government payment on an order held up because the ceiling price was not listed on their invoice.

OPS Calms Fears — At a machine tool industry advisory committee meeting held in Washington recently, there was some assurance that builders would be officially relieved of complying with the regulation. OPS officias heard the industry's case with sympathy and some action is expected.

The general uncertainy concerning future of the machine tool industry was discussed also at the same meeting with officials of the National Production Authority. Some idea of what the industry could expect in the way of government orders was requested.

Backlogs Fall — Overall steady decline of backlogs throughout the industry was pointed out and also the fact that defense needs for certain types of machine tools are being filled. In view of recent cancellations many builders are looking at their order books and wondering whether they have orders there or not.

NPA reported extreme difficulty in getting the various services to state their needs and so the matter was left hanging.

A freeze of non-rated orders 60 or 90 days before shipment of the machine tool is still being discussed. However, no immediate action on such a move is forecast.

NPA is of the opinion that government requirements are still urgent and must be cared for first. In view of the decline in some government buying, concessions may be made later on.

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U. S. Hunts New Iron Ore Sources

American steel interests press search for new deposits . . . Include well-populated areas . . . U. S. will finance much of mineral development, as it did before — *By F. Sanderson.*

American steel interests are paying more and more attention to Canada in their hunt for new iron ore deposits. It is not the remote unexplored districts that are attracting attention, but fairly well-populated areas including sections of Ontario, Quebec and other eastern provinces.

Big tonnages of high grade ore have been discovered in the Quebec-Labrador sections as well as in the Steep Rock area of Ontario, but there are other fields still to be explored in areas where transportation is not so great a problem.

It now is apparent that in the years to come Canadian iron ore deposits will be developed in a big way. But financial control will be largely in the hands of U. S. interests. Thus history again is being repeated.

For most of the first half of this century it was U. S. capital that financed the development of our industry. At one time some 75 pct was controlled in the U. S. In recent years there has been a change. U. S. capital now controls only between 30 to 40 pct. The pouring in of development capital for production of iron ore may see another big swing to U. S. control over the next few years.

Search Starts — Latest indication that American interests are shifting their search for iron ore to Canada is the announcement that Cleveland-Cliffs Iron Co. of Cleveland, through its wholly-owned subsidiary Canadian-Cliffs Ltd., is undertaking extensive examination and exploration of iron ore prospects in the Dominion.

This new company is doing exploratory work in New Brunswick, Quebec and Northwestern Ontario. It has outlined a long-range program with substantial expenditures. Idea is to cover the whole Canadian field for competition for Canadian iron deposits is expected to become increasingly keen.

Plans include maintaining prospectors in favorable areas, acquiring ground by option or outright purchase, exploring and developing ore deposits, and bringing any ore found to production as quickly as possible.

Program will be under the direction of Dr. M. W. Bartley, resident manager, with headquarters at Port Arthur.

Atomic Priority—J. P. C. Gauther, director of priorities in the Canadian Defence Production Dept. at Ottawa, announced that the U. S. Government has granted special priority to Canadian procurement of secret materials needed for the construction of the new atomic energy reactor at Chalk River. Canadian manufacturers and distributors filling orders for the atomic energy program have been assigned a new preferential priority by U. S. Defense Production Administration.

Officials said it will be of particular help to those firms supplying Atomic Energy of Canadian Ltd., and Eldorado Mining & Refining (1944) Ltd., the two Canadian atomic energy agencies, with material for the new Chalk River reactor. Some of these materials are obtainable only in the U. S.

Smelting Need Study — R. E. Sommers, British Columbia, Minister of Land and Forests, says that his government is going to launch a thorough study to find out if B. C.'s steel manufacturing capacity can be enlarged to include the smelting of domestic ores.

The government is going to look into the matter of iron ore export and into the iron and manganese ore reserves built-up by the previous government. Mr. Sommers said "The government will publish its findings, whatever they may be, and if there is anything practical it can do to encourage the smelting of iron ores in the province a policy will be announced."

For many years British Columbia has been trying to obtain smelting facilities for its iron ore deposits. Nothing has come of it because enough ore has not yet been discovered to justify building a blast furnace.

For the past several months iron ore from the Quinsam Lake deposits on Vancouver Island, under development by Argonaut Co., subsidiary of Utah Construction Co., has been exported to Japan and within the past 2 or 3 weeks a shipment of 10,000 tons was made to Bethlehem Steel Co.

C. D. Howe, Minister of Defence Production, will open Canada's largesnt aero engine plant at Malton, Ont., Sept. 29. Constructed by the government for Avro Canada Ltd., the multi-million dollar plant covers 700,000 sq ft. It already is turning out Orenda jet engines for the Canadian designed CF-100 long range fighter.

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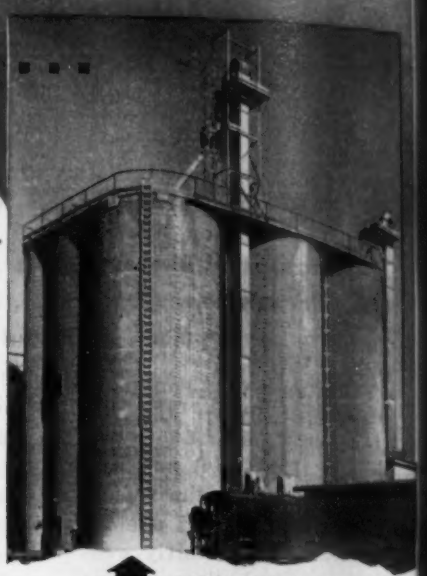

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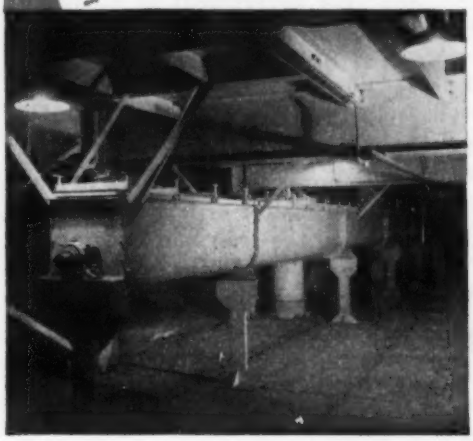

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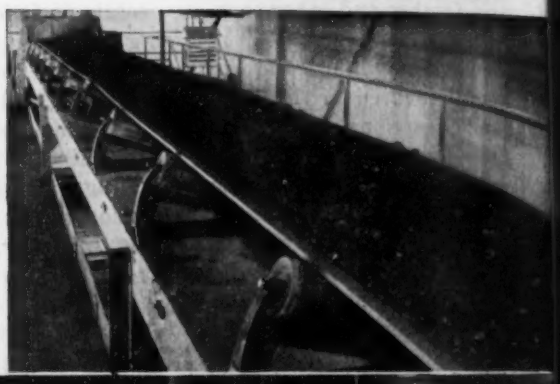

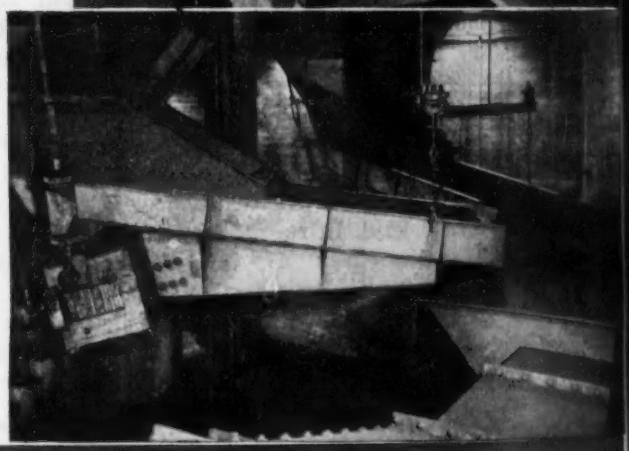

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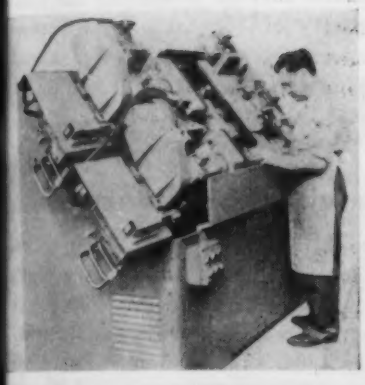
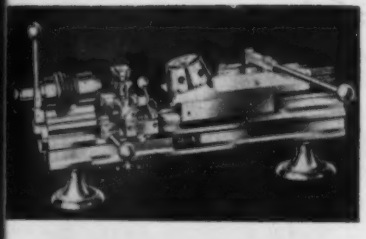


High production Bore-Matic for wrist pin holes

Wrist pin holes in pistons can be produced at the rate of 700 parts per hour on the new model 355 Heald Bore-Matic. Operation consists of semi-finishing bores, finish grooving and chamfering. The machine consists of four special hydraulic cross slides mounted on a fabricated base with a two-station hydraulically operated fixture positioned between the slides. A boring head and related drive equipment are mounted on each slide. While rear opposing slides are processing one piston, the front slides are at rest for unloading and loading. Second half of cycle is pushbutton controlled. Coolant for each station, which is piped into the piston, shuts off automatically as the cross slides for each station reach the rest position. *Heald Machine Co.*

For more data circle No. 18 on postcard, p. 121.



Turret lathe suitable for instrument parts

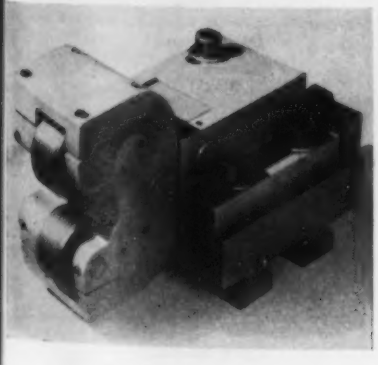
A small sensitive turret lathe handles very small parts. It is made with two collet capacities, 3/16 or 5/16 in., is equipped with a lever operated collet closer, a double tool cross slide with a swivel compound slide, and a self indexing, 6-position turret. The bed is 18 in. long. Turret slide is made of hardened steel for accuracy and long wear. *Louis Levin & Son, Inc.*

For more data circle No. 19 on postcard, p. 121.

Assembled units drill, tap five holes at a time

Correct alignment between Locke drill heads and drill fixture bushings of this bezel drilling and tapping table was obtained by precision machining and careful assembly. The table's components are: five Locke air-opened drilling and tapping units, bezel fixture, fixture clamp, motor support brackets and pedestal. Each Locke unit is powered by a ½ hp electric motor. Drill heads thrust forward simultaneously, entering fixture bushings to drill five holes at a time in the bezel which has been clamped in the fixture. Bezel fixture is cast iron; its drill bushings of hardened and ground steel. *Beaver Machine & Tool Co., Inc.*

For more data circle No. 20 on postcard, p. 121.

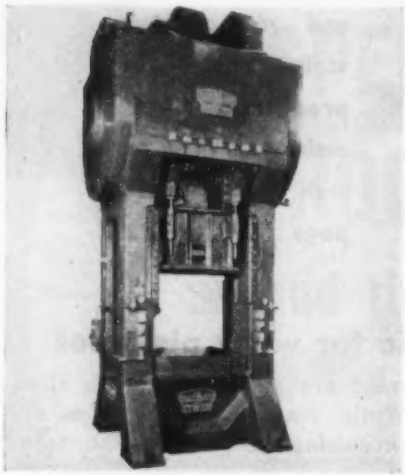


Attachment permits threading close to shoulders

Used in automatic screw machines and turret lathes, a new thread rolling attachment permits threading close to shoulders. Since rolling can be done on the collet end of the part behind shoulders, a secondary operation is often eliminated. The attachment is a multipurpose, geared type, built in three standard sizes, ½, ¾, and 1 in. Changing thread rolls and adjusting them for size are readily accomplished. The head allows the rolls to automatically position themselves in relation to the center line of the spindle on contact with the work. Class 2A and 3 American Standard threads can be rolled. Taper rolls are interchangeable with straight rolls. *Reed Rolled Thread Die Co.*

For more data circle No. 21 on postcard, p. 121.

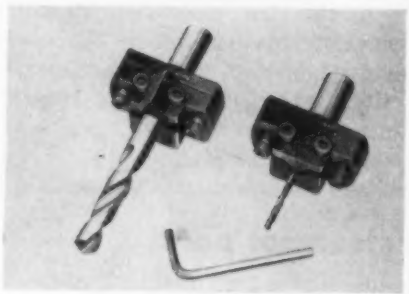
Turn Page



Toggle press arranged for twin drive

The Cleveland Punch & Shear Works Co. has recently announced their single crank double action toggle press. It is arranged for twin drive and equipped with the Cleveland (patented) Drum Type Friction Clutch with spring loaded brake. The press, which has an air counterbalanced slide, is provided with an auxiliary air brake on the flywheel to bring it to a quick stop when the press is being shut down. The outer, or blankholder slide, is provided with air loaded safety links. Press specifications include: stroke 20 in., adjustment 10 in., shut height 42 in., area of bed 48 x 48 in. Maximum capacity is 200 tons and rate of operation is 12 strokes per min. The pneumatic cushion in the bed has a capacity of 35 tons at 100 lb pressure. Overall travel is 9 in. *Cleveland Punch & Shear Works Co.*

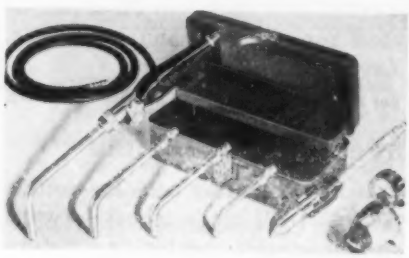
For more data circle No. 22 on postcard, p. 121.



Tool holder guarantees perfect tool alignment

Just slip tool in jaw and tighten—reportedly that is virtually all there is to aligning a tool in the new Brookfield holder. Adjustable V jaw holds any diameter tool from 1/64 to ½ in. without use of bushings or other accessories. Simple inversion of jaw plate makes possible the clamping of the wider diameter tools in the unit's holding range. Tool holder's shank and V jaw section are parallel within 0.0005 in. in 6 in. Runout is less than 0.0001 per in. *Brookfield Inc.*

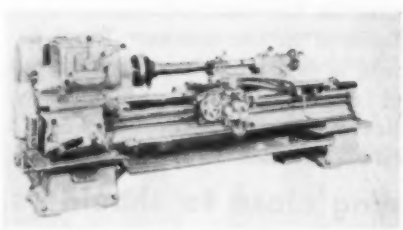
For more data circle No. 23 on postcard, p. 121.



Soldering, brazing, heating with one outfit

Full capacities of five separate outfits for soldering, heating, and light brazing are combined in one new Prest-O-Lite 5-in-1 precision air-acetylene outfit. Four open-flame torch stems and a pointed copper soldering iron attach interchangeably to a newly designed precision control handle which is equipped with a pilot needle valve contained in the shutoff valve. Acetylene regulator is for any pressure to 13 psi. *Linde Air Products Co.*

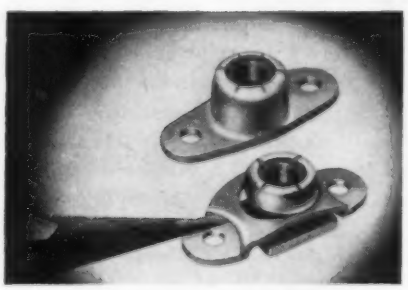
For more data circle No. 24 on postcard, p. 121.



Lathe attachment more accurate

A simplified hydraulic contouring attachment has been developed to provide greater sensitivity and accuracy for Springfield lathes. It can be used for turning, boring and facing of shafts, axles, rotors, and other parts with varying diameters, shoulders, tapers, radii and flanges. Its smooth operation results in superior finishes. *Springfield Machine Tool Co.*

For more data circle No. 25 on postcard, p. 121.



New floating type anchor nut

Quick self-alignment and simplified assembly are made possible by a new floating anchor nut. An anchor lug with an offset shoulder assures floating action of the nut thereby preventing interference between it and the rivets holding the lug to an assembly. Elimination of costly lining-up operations and weight savings of 1.3 lb per 1000 prices are claimed. Smaller external dimensions permit its use in small spaces. *Elastic Stop Nut Corp.*

For more data circle No. 26 on postcard, p. 121.

Turn to Page 130

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"THIS IS WHAT HAPPENS TO GOOD LITTLE PIGS!"

PRINCESS WENATCHEE: You mean *Electro-Silvery* pigs!

CHIEF KEOKUK: Yes indeed! Those good little pigs end up helping to make important products like this farm tractor . . .

PRINCESS WENATCHEE: . . . and countless other products like tanks and automobiles . . .

CHIEF KEOKUK JR: Hey, Pop—what *is* Electro-Silvery?

CHIEF KEOKUK: Electro-Silvery, son, is a form of ferro-silicon that acts as a vital control element in the production of iron and steel . . .

PRINCESS WENATCHEE: . . . and the largest producer in the world of this vital ingredient is Keokuk Electro-Metals Company .

Keokuk Electro-Silvery is used by foundries and steel plants in the form of these three pigs, weighing 60 pounds . . . 30 pounds . . . and 12½ pounds.

KEOKUK

ELECTRO-METALS COMPANY

KEOKUK, IOWA

WENATCHEE DIVISION: WENATCHEE, WASHINGTON

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FOR continuous, trouble-free performance, switch from conventional underfired heating or melting to Kemp Immersion Heating. Then like many other industrial users, you can use your Kemp Pot *continuously* in annealing, coating, tempering, descaling, etc.—*without* the threat of periodic shutdowns for breakage. Kemp Pots also eliminate temperature override, open flame fire hazards and the need for many unsightly external pipes and ducts.

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With Kemp Immersion Heating, you are assured maximum melting or heating efficiency . . . *plus* an estimated savings in fuel of up to *40% and more*. Thanks to Kemp engineering, these savings are built into every unit. You get greater heating surface, faster heat recovery, lower dross formation, even lower room temperatures. There's no brickwork to steal heat . . . no external combustion chamber . . . no carbon monoxide. You're money ahead when you switch to Kemp.

Easy to Use, Easy to Maintain

The Kemp Carburetor, part of each installation, delivers complete combustion . . . without waste . . . without tinkering. One-pipe air and fuel feed reduces installation costs, simplifies maintenance. Kemp service also includes a staff of trained technicians who are instantly available at all times.

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405 E. Oliver St., Baltimore 2, Md.

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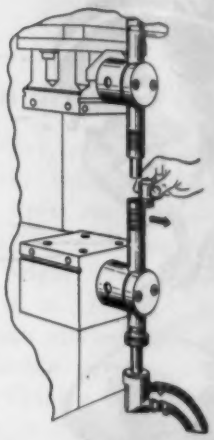
ADSORPTIVE DRYERS • METAL MELTING UNITS • SINGEING EQUIPMENT • SPECIAL EQUIPMENT

—New Equipment—

Continued



Holders, electrodes

Heavy duty Nu-Twist holders and electrodes represent a new approach to electrode holder construction for spot welding forces above 6000 lb. The flat surfaces between holder and electrode support the highest welding pressures. Double grooved locking nut bore assures positive central alignment. Nu-Twist holders are available in 8 and 12-in. lengths and 1½, 1¾, 2 and 2½ barrel diam. *P. R. Mallory & Co., Inc.*

For more data circle No. 27 on postcard, p. 121.

Waterproof sandpaper

Freeness of cut and ability to maintain initial sharp bite in wet sanding are features of Tufbak Speed-Wet Durite Paper. This new waterproof sandpaper for industrial use has extremely tough backing which permits maximum flexibility. Increased body strength resists creasing, cracking and curling. Its advantages apply whether soaked in usual liquids for minutes or hours. *Behr-Manning Corp.*

For more data circle No. 28 on postcard, p. 121.

Air Hardening Stock

Precision ground die and flat stock made especially for hardening in air has been added to the Starrett line. It is recommended for punches and dies in long production runs, or for stamping silicon, stainless steel, Monel and other abrasive materials. Punch and die life can be increased as much as 50 pct. *L. S. Starrett Co.*

For more data circle No. 29 on postcard, p. 121.

Tiny grinding wheels

An abrasive point, having a 1/16 in. diam is believed to be the world's smallest commercial mounted wheel. These wheels are used for precision applications such as grinding holes in miniature bearings, bushings and instruments. Exact duplication of the most minute parts is claimed to be possible with these tiny wheels. *Chicago Wheel and Mfg. Co.*

For more data circle No. 30 on postcard, p. 121.

Weld heater

Purpose of a new electric tubular heater is to reduce the temperature differential between the weld area and adjacent metal. The heater slows conduction of heat from the weld thereby eliminating locked-in stresses. Before welding is started the heaters raise the temperature in the weld zone to 400-500°F and maintain that temperature until welding is completed. Pre-heating and post-heating periods vary depending on type and thickness of metal. *Edwin L. Wiegand Co.*

For more data circle No. 31 on postcard, p. 121.

Centering vise

Regardless of the shape being clamped, this new vise has been developed to save time and cut the cost of finding centers to within ±0.001 in. either horizontally or vertically. It has two opposed pneumatic cylinders with master jaws at the ends of the rods attached to the pistons. Movement of both jaws is mechanically synchronized. It operates on 5 to 100 lb air pressure depending on the desired force at the jaws. Clamping pressures up to 2000 lb; working range 0 to 4 in. may be obtained. The Centr-Finder vise requires less than 2 sq ft of bench space. *Black Drill Co., Inc.*

For more data circle No. 32 on postcard, p. 121.

Turn Page

Extensive Stock
OF
KENNAMETAL TOOLS,
BLANKS, and INSERTS
NOW CARRIED BY OUR
DISTRICT WAREHOUSES
AT STRATEGIC POINTS
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Phone the one nearest you if your need is urgent
This expanded service enables you to quickly realize the plus value of Kennametal tooling — decreased cost — increased productivity. There's a Kennametal tool for your every need.
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TAR-A
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K3000
TB
"H"
SDH

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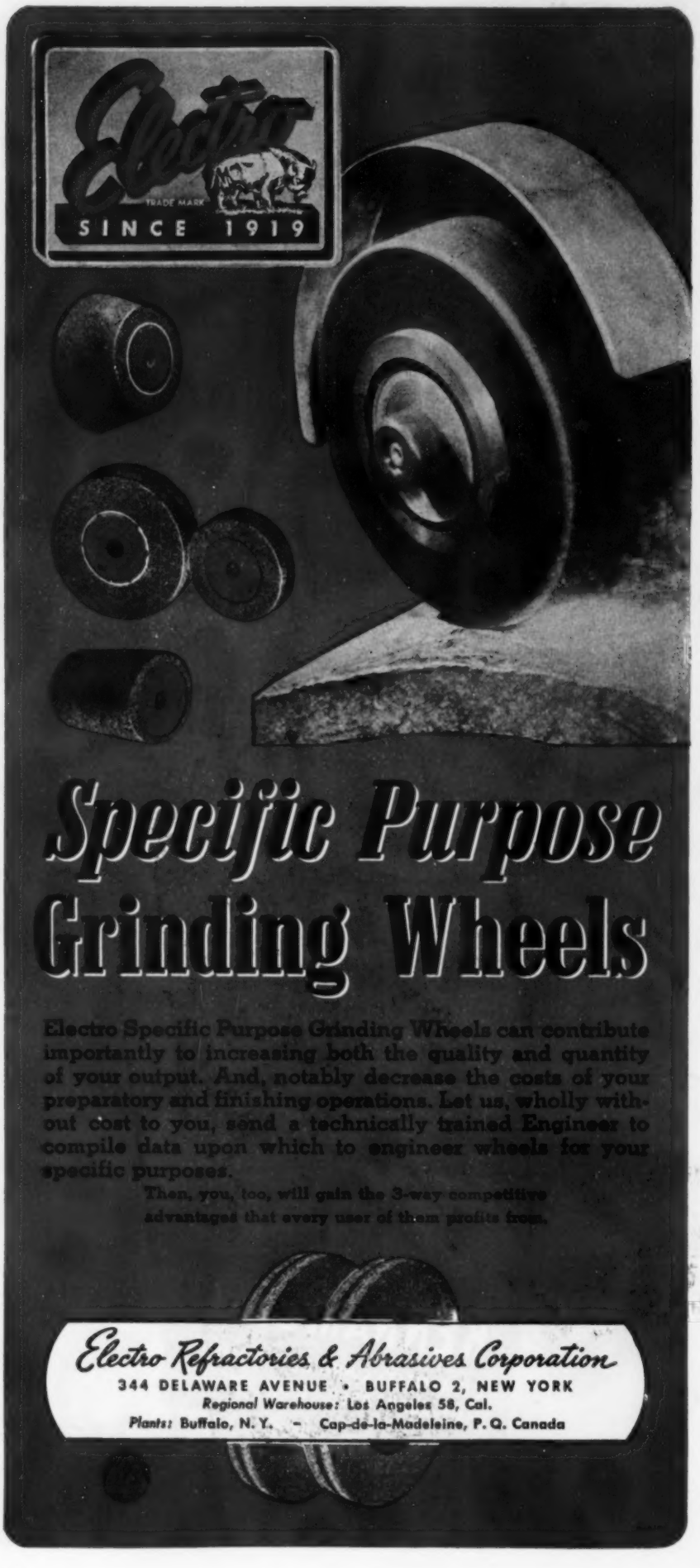
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Specific Purpose
Grinding Wheels
Electro Specific Purpose Grinding Wheels can contribute importantly to increasing both the quality and quantity of your output. And, notably decrease the costs of your preparatory and finishing operations. Let us, wholly without cost to you, send a technically trained Engineer to compile data upon which to engineer wheels for your specific purposes.
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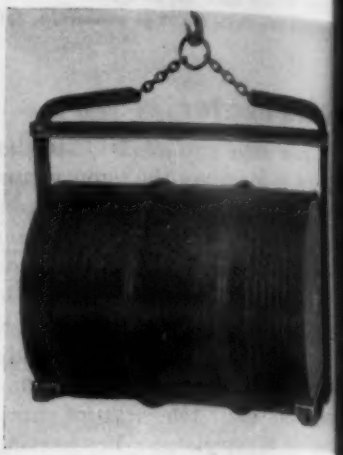
—New Equipment—

Continued

Barrel cradle

This barrel type cradle picks u any shape barrel, plywood or fibe drums, straight or bulged side flat or chimed ends. Also ideal fo rolls of paper, carpeting and othe cylindrical shapes. Capacity 100 lb. *Palmer-Shile Co.*

For more data circle No. 33 on postcard, p. 12



Electronic timer

Four basic types of timing—inter val, delayed action, automatic re peat, and programming—are pro vided by this new electronic timer Intervals range from 1/20 sec to min. All timing combinations are incorporated in the one timer and may be utilized by merely changing external connections to the termi nal board. The instrument is recommended for process contro machine timing and other indus trial applications where long life repeat-cycle operation or precise accuracy is a prerequisite. *Photo-switch, Inc.*

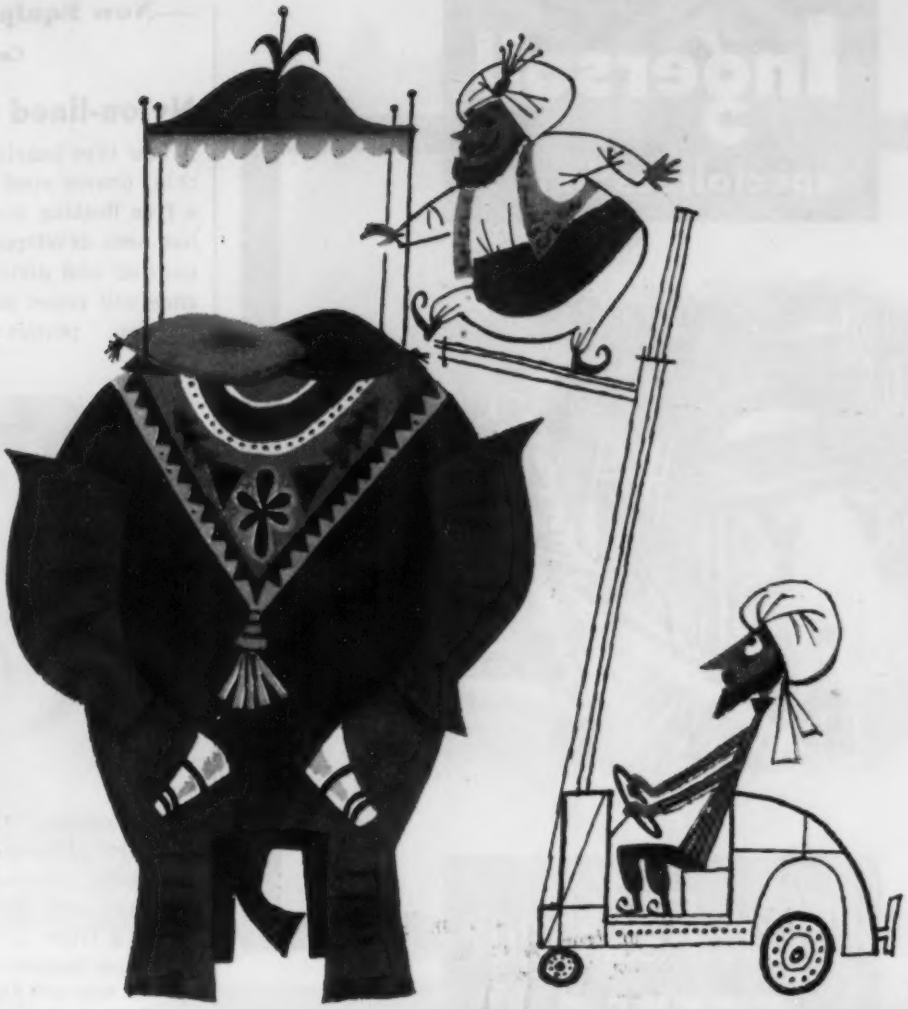
For more data circle No. 34 on postcard, p. 12

Liquid stops corrosion

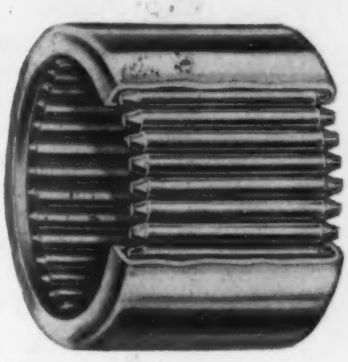
Kelite M-2, recently developed, pro tects mild steel from corrosion after cleaning. It affords superior inhibiting properties, eliminates drying prior to treatment, and is impervious to finger printing. Ap plication may be by immersion spray or brush. It is non-flam mable, non-phenolic and non-toxic *Kelite Products, Inc.*

For more data circle No. 35 on postcard, p. 12

Turn to Page 134



easy mounting...



Torrington Needle Bearings are easy to mount. Installation is a simple arbor press operation. Assembly time and expenses are reduced.

You can forget about spacers, retainers and positioning shoulders, too. They are not needed with Needle Bearings. A straight bore, of proper size, serves as the housing. Thus, design is simplified and machining time is saved.

Would you like to know more about Torrington Needle Bearings in terms of your own anti-friction requirements? Our engineering department will be glad to help.

THE TORRINGTON COMPANY
Torrington, Conn. South Bend 21, Ind.
District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON NEEDLE BEARINGS

Needle • Spherical Roller • Tapered Roller • Straight Roller • Ball • Needle Rollers

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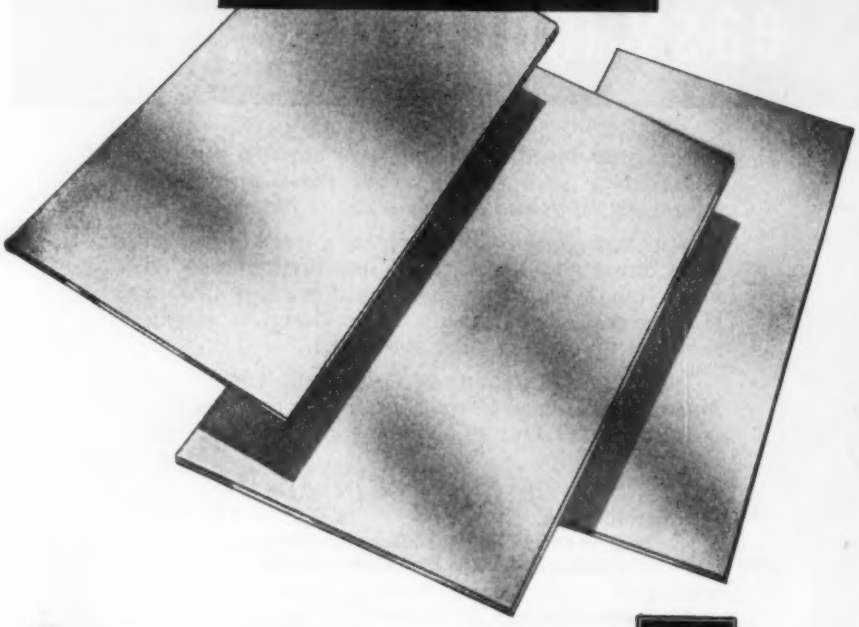

Ingersoll STEEL DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue, Chicago 4, Illinois
Plant: New Castle, Indiana

ENGINEERING B-W PRODUCTION

—New Equipment—

Continued

Nylon-lined bearings

A new type bearing consisting of a thin, drawn steel outer sleeve and a free floating inner liner of nylon has been developed to allow for expansion and distortion. Its resilience will resist poundout, decrease friction, permit dry operation,

damp mechanical vibration and minimize abrasion failures. These extremely compact, light weight bearings are offered in 10 sizes ranging from ¼ in. to 1¼ in. ID. *Thomson Industries, Inc.*

For more data circle No. 36 on postcard, p. 121.

Steel mesh baskets

NesTier materials handling system includes a new steel mesh basket shaped like the original NesTier box. It is designed for efficient handling and space saving during operations where small parts are being moved or dipped in chemicals, paints and other liquids. Rustproof and corrosion-resistant, the basket can be nested when not in use and tiered when filled with parts. Folding handles are located at either end of the basket. *Chas. Wm. Doepke Mfg. Co.*

For more data circle No. 37 on postcard, p. 121.

Diamond abrasive

New plastic cartridge replaces glass cartridges formerly used for packing diamond abrasive, DYMO. The cartridge is a precision tube, sealed at both ends, designed for use with applicator guns. Five and 18 g sizes are available. *Elgin National Watch Co.*

For more data circle No. 38 on postcard, p. 121.

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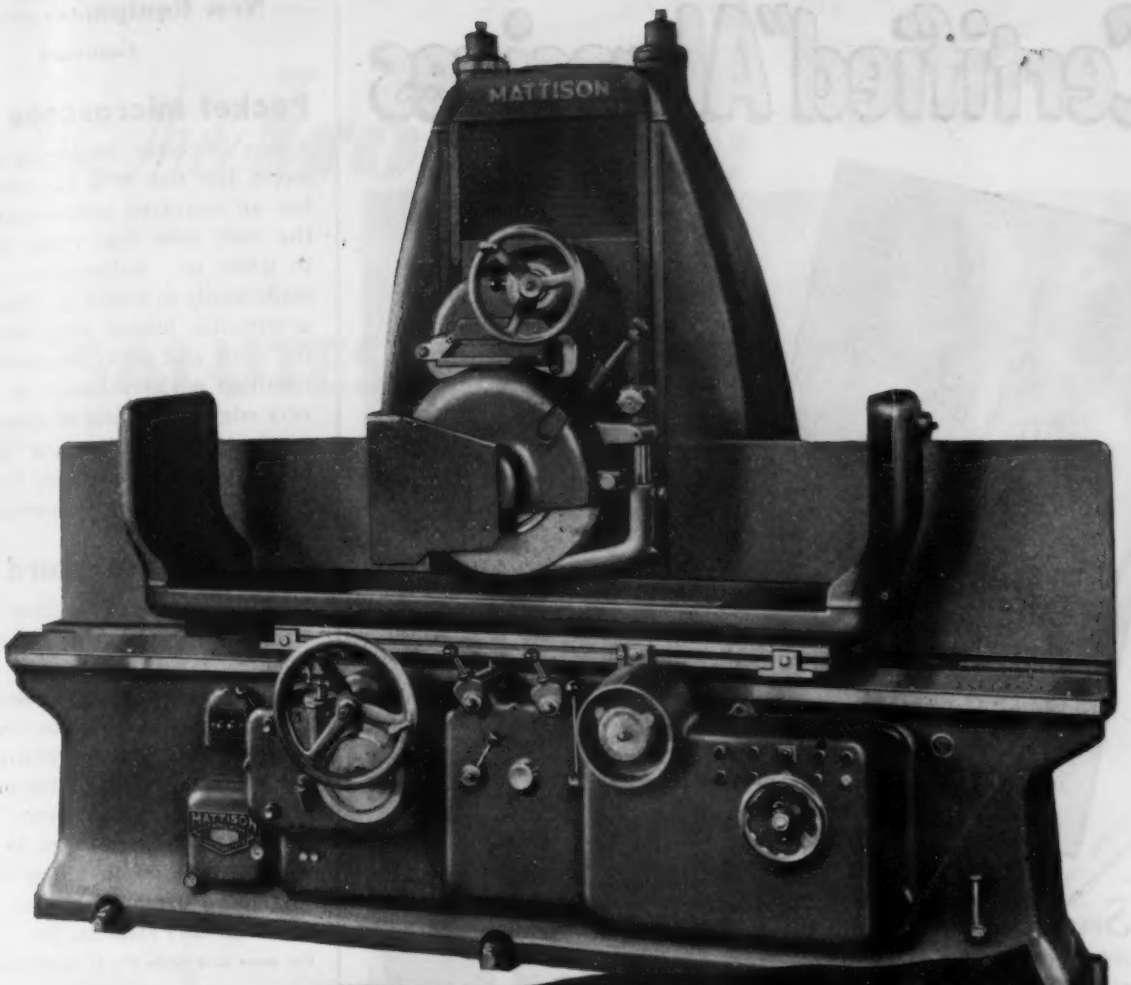
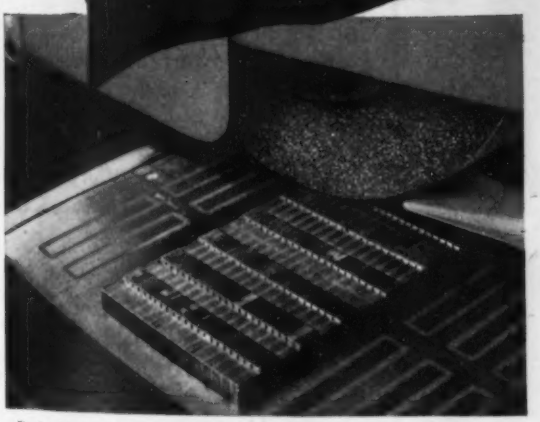


HERE'S A CHANGE THAT INCREASED PRODUCTION FROM 30 PER HOUR TO 200 PER HOUR



Both sides of type-stamps are now ground 200 per hour on a Mattison Grinder. Previous production — 30 per hour.

● Because of the greater load and grinding area of their Mattison High Powered Precision Surface Grinder, Geo. T. Schmidt, Inc., Chicago, Illinois have been able to effect considerable savings in grinding time over their previous method. As an example — the type stamps shown in the picture above were formerly ground a few pieces at a time on a small grinder — 30 per hour. The Mattison Grinder they are now using provides larger table space and a larger grinding wheel together with the necessary power and stability to permit the grinding of more pieces per load at a production rate of 200 per hour. Similar results are obtained on other parts.

Mattison High Powered Precision Surface Grinders have the high power and rugged double-column construction for rapid stock removal and the precision necessary for high quality finish and accuracy to close limits.

This combination not only will enable you to step up production on small parts, but permits grinding large work which previously could not be handled. For further information send for free circular.

MATTISON MACHINE WORKS

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"Certified" Abrasives

CLEAN MORE CASTINGS PER DAY!

SPEED UP production in *your* blast cleaning room with "Certified" Abrasives. "Certified" Samson Shot and Angular Grit are first choice in hundreds of foundries...give better, longer performance because they're made *extra-tough* by a special *automatically controlled* hardening process. Specify "Certified" and start cleaning more castings per day.

All sizes graded to S.A.E. specifications

Experienced Foundrymen say:

Always specify "Certified"

ACCEPTED AND USED FOR OVER 55 YEARS

PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.

STEEL SHOT AND GRIT CO., Boston, Mass.

FEMA

—New Equipment—

Continued

Pocket microscope

A new 50-power, measuring microscope, the size of a fountain pen, has an engraved scale mounted in the body tube that reads directly to 0.002 in. Estimations can be made easily to 0.0005 in. Precision, achromatic lenses, fully corrected for color and spherical aberration, result in a sharp image up to the very edge of the field of vision. The handy tool is tradenamed Optometer. *National Instrument Co.*

For more data circle No. 40 on postcard, p. 121.

Power press guard

Meeting the most exacting safety requirements, a new basket enclosure type guard fits punch presses of all sizes, makes and types. Front and side barriers can be tilted in or out as required and the vertical rods adjusted to clear die straps or air nozzles. The whole front barrier can be tilted up or taken off in a few seconds to remove damaged blanks. *Searjeant Metal Products, Inc.*

For more data circle No. 41 on postcard, p. 121.

Lift truck scales

Small hydraulic lift scale fits on any hydraulic cylinder type fork truck. It shows the driver exactly how much weight he has picked up with the truck, insuring full load with safety every time. The device also enables a fork truck driver to keep count of the total weight he has loaded on a highway truck or railroad car. Weight of each load is read directly on the dial, as it is lifted. *Martin-Decker Corp.*

For more data circle No. 42 on postcard, p. 121.

Collector rings

Collector rings for brake motors are being molded by Rockford Molded Products Co. from GE rubber-phenolic compounds, resulting in cost reductions and improvement in electrical characteristics. High internal resiliency allows compressing the brass rings into the molded part after molding. Minimum of breakage results. *Chemical Div., General Electric Co.*

For more data circle No. 43 on postcard, p. 121.

The Iron Age

SALUTES

Warden F. Wilson

Now president of a company, he won recognition when still a student, now is working on alloy steel castings.

THERE'S nothing lukewarm about Ward Wilson. He won kudos for special work in refrigeration engineering while still a student at University of Illinois. Today, as president of Donegal Mfg. Co., Marietta, Pa., he handles some of the hottest problems in alloy steel casting.

With two engineering degrees, Ward began his climb with American Steel Foundries in 1925. In 15 years he was successively assistant to the works manager, at Indiana Harbor, Ind.; manager of that company's Pittsburgh and later Verona, Pa., Works; and general sales manager of Lebanon Steel Foundry, Lebanon, Pa.

He became president of Donegal in 1951, is now directing a modernization and expansion program there. This firm is one of the handful in either the U. S. or Britain equipped for permanent-mold centrifugal casting of high-alloy steel.

Ward has been a leader in developing industrywide research and product engineering activities. He is a key man behind the information program of Steel Founders' Society of America. A former president and director of Alloy Steel Casting Institute, he is also a member of A.S.M.E. and many other technical and engineering organizations.

Work comes second only to his family and home life. What spare time he has is spent in his home workshop, on intricate cabinet making and metalworking projects. Many of these decorate his home—a reproduction of an historic Williamsburg, Va., building. Adaptations for modern living were worked out by Owner-Designer Wilson.

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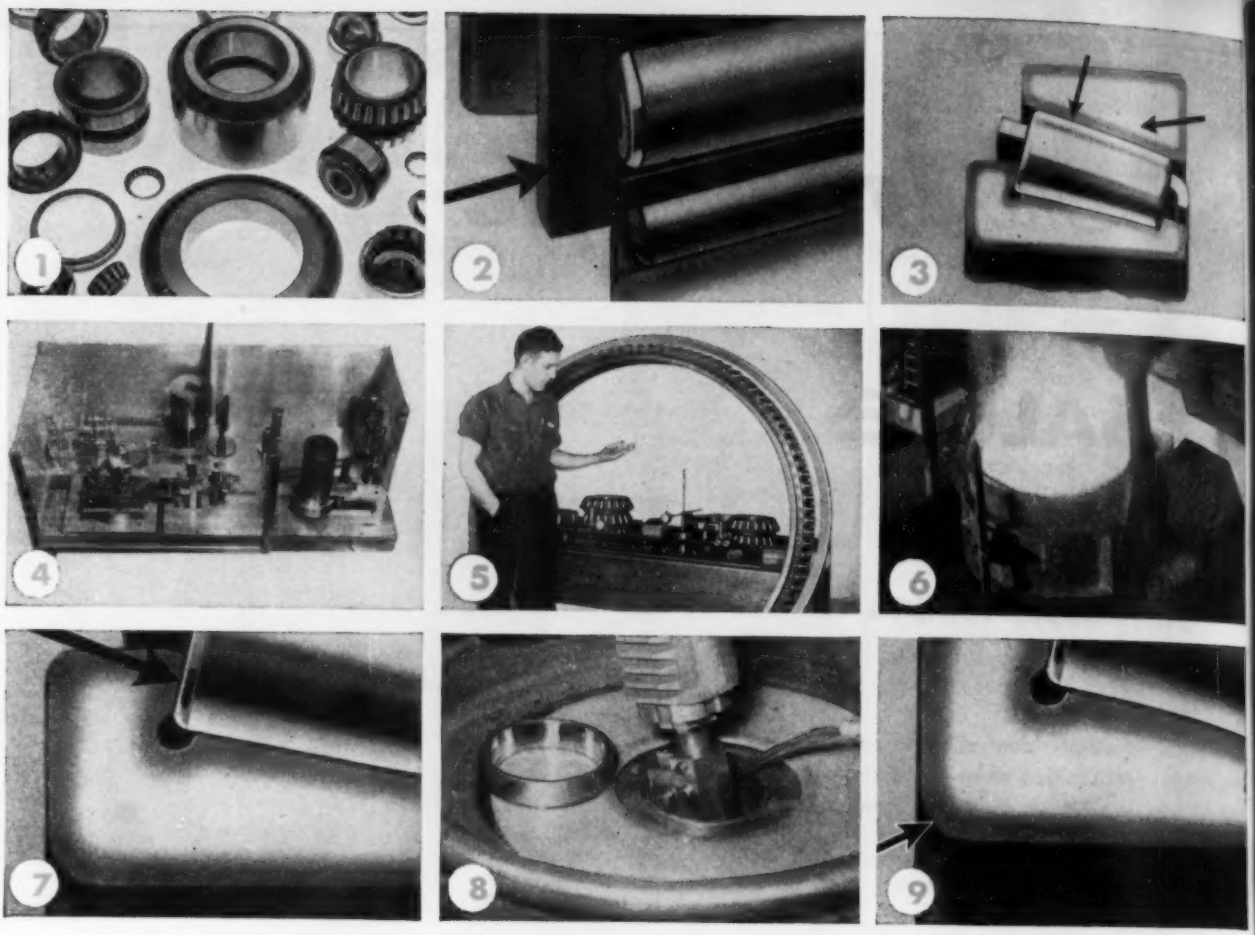

You get all these advantages with TIMKEN® bearings!

Shown above are some of the important reasons why it pays to specify Timken® when you buy tapered roller bearings.

1. 26 TYPES. Because Timken bearings are made in 26 different types, you get exactly the right one for your job.

2. SOFT STEEL CAGE separates the rollers in Timken bearings and prevents scuffing.

3. TOUGH INSIDE—HARD OUTSIDE. Case carburizing of Timken bearing rollers and races gives them a hard, wear-resistant surface, combined with a tough, shock-resistant core.

4. MICRO-INCH FINISH. With help of the profilograph which measures surface irregularities to a millionth of an inch, the Timken Company has developed a bearing finish of micro-inch accuracy.

5. 5850 SIZES. If you need a bearing smaller than your finger or 71½" in diameter, you can get it from the Timken Company.

6. WE MAKE OUR OWN STEEL. Because Timken bearings are made of special alloy steel, produced in the Timken Company's own mills, they have extra strength and wear resistance.

7. POSITIVE ROLLER ALIGNMENT is maintained by the rib of cone—skewing prevented, maximum bearing capacity assured.

8. CLOSER TOLERANCES in the manufacturing of Timken bearings make possible production bearings with a maximum runout of 75 millionths of an inch or less.

9. GENEROUS RADIUS on the inside diameter of Timken bearing cones permits greater shaft strength.

No other bearing can give you *all* the advantages you get with Timken bearings. Be sure the tapered roller bearings you buy carry the name "Timken", the trademark of The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Canadian plant: St. Thomas, Ontario.

TIMKEN TAPERED ROLLER BEARINGS

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NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬭ AND THRUST →⬭← LOADS OR ANY COMBINATION

The Iron Age

INTRODUCES

Hickman Price, Jr., elected president and director, WILLYS-OVERLAND EXPORT CORP.

David E. Neustadt, becomes vice-president and general manager, CHAS. RIVITZ & CO., INC., Cleveland.

King Williams, named assistant to the president, on special assignment as PACIFIC AIRMOTIVE CORP. European Representative.

J. L. Adams, promoted to assistant to the president, BOHN ALUMINUM & BRASS CORP., Detroit; **Raymond C. McCullough**, named divisional sales manager; and **Richard C. Aylward**, named manager, Chicago office.

Harold E. Churchill, appointed chief engineer, STUDEBAKER CORP., South Bend, Ind.

Donald E. Williamson, named president, CO-DESIGN CORP., Winchester, Mass.

George O. Manifold, appointed director of education, HAGAN CORP.

H. F. Kluender, appointed secretary-treasurer and director, VISI-TROL CORP., Detroit.

William S. Woolsey, appointed director of truck sales, Dodge Div., CHRYSLER CORP., Detroit.

Lawrence P. Head, appointed sales engineer, regional office, St. Louis, COOPER-BESSEMER CORP.

Francis F. Florsheim, named chairman of ASSN. OF. ELECTRONIC PARTS & EQUIPT. MFRS.

Donald W. Dawson, appointed manager of sales, Building Products Div., THE AMERICAN WELDING & MFG. CO., Warren, Ohio.

Donald F. Sheridan, appointed head of Wichita office, KAISER ALUMINUM & CHEMICAL SALES, INC.; **Wallace A. Davidson**, appointed manager, Kansas City district office; and **Richard E. Hanson**, appointed assistant to general sales manager, Chicago general sales office.

Lester J. Hyland, appointed sales manager, Industrial Rubber Div., THERMOID CO., Trenton, N. J.

James S. Mumper, joins the staff of OSCO STEEL CO., Cleveland.

J. H. Brinker, appointed assistant executive in charge of distribution, A. O. SMITH CORP., Milwaukee.

Fred H. Newcomb, appointed industrial relations manager, HYDRO-AIRE, INC., Burbank, Calif.

Louis A. Walker, appointed assistant business management manager, LINCOLN-MERCURY DIV., Detroit.

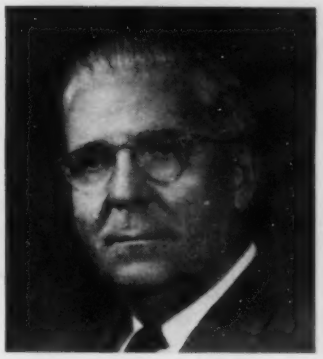
Orville A. Zimmermann, appointed office manager, Supply Div., Chicago District, U. S. STEEL; and **Sylvan A. Boxdorfer**, appointed office manager, St. Louis District.

Maurice J. Day, named manager, Materials and Processes Div., ARMOUR RESEARCH FOUNDATION of Illinois Institute of Technology, Chicago.

Charles Kuhn, appointed sales manager, FANSTEEL METALLURGICAL CORP., North Chicago.

William D. MacGaregill, joins sales staff of CONTROL ENGINEERING CORP., Norwood, Mass.

Herbert F. Ziegler, Jr., appointed manager, Kansas City District office, STERLING ELECTRIC MOTORS, INC.



GEORGE S. NEEL, elected vice-president, central and western region sales, Chicago, U. S. Steel subsidiary, Universal Atlas Cement Co.

W. ROY WIDDOES, appointed to the president's staff, Lukens Steel Co., Coatesville, Pa.

SEYMOUR C. BEIDNER, elected president, newly formed Jefferson Steel Corp., New York.

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Personnel

Continued

Stanley J. Pachyn, named general sales manager, Boiler Div., DUTTON BOILERS, a division of Hapman- Dutton Co., Kalamazoo; and **Herman Williams,** named service manager and assistant sales manager.

J. M. Douglas, named valve sales manager, Central region, MINNEAPOLIS-HONEYWELL REGULATOR CO. He will make his headquarters at the Cleveland branch office.

August R. Ryan, named manager of sales for furnaces and associated equipment, Industrial Heating Dept., GENERAL ELECTRIC, Schenectady.

Anthony J. Swisler, appointed regional manager, West Coast, WHITNEY CHAIN CO., and **George A. Banton,** appointed district manager, Southern California and Arizona.

Conde Hamlin, named general sales manager, DEWALT INC., Lancaster, Pa., subsidiary of American Machine & Foundry Co.

Dean B. Skillin, named sales representative, CONTINENTAL SCREW CO., New Bedford, Mass.; and **Frank M. Hart,** also appointed sales representative.

William C. Portman, becomes sales manager, NesTier Div., CHARLES WM. DOEPKE MFG. CO., INC., Cincinnati.

John C. Durbin, Jr., appointed factory sales representative, NEW YORK BELTING & PACKING COMPANY, in Washington, Oregon and Idaho.

Robert W. McLean, named Pacific Coast market development representative, WESTINGHOUSE ELECTRIC CORP.

Eugene A. Nicol, named superintendent, Dryer Dept., THE MAYTAG CO., Newton, Iowa; and **Clarence Eaton,** named general foreman, new Dryer Dept.

Harold C. Rowland, appointed sales representative, ROYAL METAL MFG. CO., Chicago, in Washington, D. C., Maryland and Delaware.

Albert W. Boegner, appointed purchasing agent, Colmar, Pa., plant, LINK-BELT CO., and **F. Walter Skerrett,** becomes purchasing agent, Philadelphia plant.

William J. Martin, Jr., transferred to the Cleveland Office, PENINSULAR GRINDING WHEEL SALES CORP.

THOMAS S. McEWAN, appointed vice-president, Lester B. Knight & Associates, Inc., Chicago.

A. B. FISHER, named a vice-president, Engineering & Construction Div., Koppers Co.

WILLIAM C. ROBINSON, becomes acting director of Industrial Relations, Lukens Steel Co.

A. B. EGAN, appointed manager sales, Kansas City area, Sheffield Steel Corp.

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Personnel

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Harold S. Barger, appointed plant superintendent, Chicago Steel Tank Div., PRESSED STEEL CAR CO., INC.

Louis V. Gagnon, appointed sales representative in Massachusetts, for FREDERIC B. STEVENS, INC.

W. P. Innes, appointed technical director, MACDERMID INCORPORATED. His headquarters will be in Waterbury, Conn.

Robert H. Poulton, appointed representative—Technical Sales, FLEXIBLE TUBING CORP., Guilford, Conn.

H. C. Splittorf, appointed credit manager, E. W. BLISS CO., Canton, Ohio.

H. H. Shakely, appointed works manager, Otis Works Div., Cleveland, JONES & LAUGHLIN STEEL CORP.; **H. P. Saxer**, appointed assistant works manager, Production, Pittsburgh Works; and **N. C. Atwood**, appointed assistant works manager, General Services.

Howard H. Gamble, appointed special representative Los Angeles District, Acme Steel Products Div., ACME STEEL CO; **Ray D. Vilas**, named sales representative in Los Angeles; **E. J. McGraw**, has been transferred to the San Francisco district; **Arthur B. Hall**, was transferred to San Francisco also; and **J. P. Brehm**, joins the sales staff of the South Central Calif. office.

Arthus Zahn, appointed to the sales department, CHESTERFIELD STEEL SERVICE CO., Cleveland.

Ralph A. Walch, appointed manager, Tax Service Dept., SYLVANIA ELECTRIC PRODUCTS, INC., New York.

W. C. Sonnie and **Douglas E. Porter**, named representatives, SUPER TOOL CO., Cleveland.

John P. Mudd, appointed public relations manager, THE MIDVALE CO., Nicetown, Pa.; and **Charles R. Gordon**, appointed general superintendent of Machine Shops.

H. M. Clouse, named assistant engineer, ALLIS-CHALMERS MFG. CO., foundries and pattern shops; and **William E. Scott**, named sales representative, Charlotte district office, general machinery division.

OBITUARIES

Hugh J. Fraser, 55 vice-president in general charge of all plant operations, in the U. S., of The International Nickel Co., Inc., at St. Mary's Hospital in Montreal after a brief illness recently.

Herman Berg, 62, superintendent, The Kelly Reamer Co., Cleveland, recently.

James C. Shepherd, 57, executive vice-president, Sheffield Steel Corp., recently, in Kansas City.

Sanford Stephenson, 55, manager of wire and wire products sales, Bethlehem Pacific Coast Steel Corp., at his home in Burlingame, Calif., recently.

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Technical Articles

Austenitic cast stainless
Good for low temperature applications
—BUT

By J. W. Juppenlatz
Chief Metallurgist
Lebanon Steel Foundry Co.
Lebanon, Pa.

Design engineers of the new low temperature processes are turning to austenitic chromium-nickel cast alloys where toughness and corrosion resistance are needed. The degree of toughness from room temperature to —432°F for the various alloys can differ widely so that care should be exercised in selection and treatment of the alloys and the parts made from the different stainless grades. A full austenitic structure or low magnetic permeability is not a guarantee of high impact strengths at low temperatures. Although welding of some grades does not seriously affect low temperature properties, post weld solution treatment is advisable for improved corrosion resistance.

Austenitic chromium-nickel cast alloys are noted for retention of toughness at extremely low temperatures, and for this reason are used for many low temperature processes. Engineers for new low temperature processes, such as the synthetic gaseous product industry, are recognizing the useful application of austenitic alloy castings to the low temperatures of operation that are often associated with harsh corrosion.

Low temperature impact properties of the more commonly used cast alloys are of importance to the design engineer. Many of these basic types of chrome-nickel alloys are classified as austenitic, while others are classed as having an austenitic matrix plus more or less of ferrite. One could presume that the most highly austenitic alloy would possess the highest impact property at room temperature and retain it at very low temperatures. This, however, is not the case. Impact test results to be discussed are taken from normally produced heats and are not considered to be minimum values.

Values given are averages of two or more tests at several levels of temperature from cast

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"Impact level is in direct relation to the temperature and hardness . . ."

1¼ in. square coupons. After heat treatment, test pieces were sectioned to make standard 10 mm keyhold notch impact tests.

Individual test results often vary under identical conditions—to the extent of 1/3 of impact value between the high and low result. None of these results with a large spread of values can be considered as brittle since high levels of impact are found. The variation of test results can partially be explained by the relatively large primary as-cast austenitic grain size with differences of crystal orientation with respect to the impact notch.

In all cases, room temperature impact level is higher than pieces tested at lower temperatures. This is due in part to increased hardness caused by lower temperatures with a proportional lowering of ductility and increased strength. Fig. 1 shows the change in properties of a 19-9 chromium-nickel austenitic type alloy of the CF-8 type. Other cast alloys with total alloy contents varying considerably, have been studied. Composition of these alloys is given in detail in Table I.

The chromium-nickel and other alloy ratio is sufficient to modify the microstructure from a chrome-ferrite-austenite to a virtual 100 pct austenite. Magnetic permeability values included in Table I give some estimate of these conditions where the value of 1.00 could be considered 100 pct austenitic. Lower values occur as the permeability factor increases.

Impact values are not strictly related to the amount of austenite or ferrite present, but seem to bear more significantly upon carbide distribution and other scattered microconstituents within the matrix. The impact test results do indicate certain trends and properties within normal variables for each type of alloy.

Fig. 1 represents studies on the most popular type of solution treated austenitic cast alloy containing 0.07 pct C, 19 pct Cr, 9.5 pct Ni. These results are averages of hundreds of low temperature impact tests from production heats. The impact level is in direct relation to the temperature and hardness without indication of brittleness or transition to minus 423°F. All tests were on material quench annealed from 2000°F minimum. This austenitic alloy is considered stable in the solution treated condition to at least minus 423°F. Castings may be used in the solution heat treated condition and are free from embrittlement.

Critical temperatures 950° to 1350°F

Sensitization, or change in stability, can be caused in these alloys at certain critical temperatures. These most critical temperatures range from 950° to 1350°F. The time at temperature as well as the temperature, has a marked influence on the impact result.

Fig. 2 covers a series of impact tests on 0.07 pct C, 20.6 pct Cr, 8.7 pct Ni cast alloy after a 2075°F solution treatment and then reheating as shown. This alloy heat is within the composition requirements of the CF-8 alloy shown in Fig. 1. Magnetic permeability value of this heat was 1.73 with a ferrite constant estimated at 12 pct higher than normal for the average of this type alloy.

No significant change in the level of room or low temperature impact properties is noted by the 1035°F treatment for periods of 3 or 30 min. However, at 1250°F for the same time, the room

TABLE I — ANALYSIS OF THE GRADES TESTED

ACI Grade*	Lebanon Designation	C	Si	Mn	Cr	Ni	Mo	Cu	P	S	N_2	Al	Other	Heat Treatment**	Magnetic Permeability	Brinell Hardness
CF-8	L22	0.07	1.25	0.79	20.64	8.68	0.35	0.10	0.013	0.014	0.051	0.021	.....	2075°F W. Q.	1.63	163
CF8C	L21	0.05	0.75	0.75	19.65	10.84	0.03	0.11	0.022	0.022	0.051	0.031	Cb 0.71 Ti	2075°F W. Q.	1.46	143
CF8T	L20	0.04	1.19	1.55	18.66	11.00	0.03	0.15	0.010	0.017	0.010	0.040	0.68	1950°F Air	1.64	142
CF-20	L23	0.11	1.20	0.74	20.38	9.43	0.07	0.10	0.020	0.025	0.050	0.032	.....	2075°F W. Q.	1.14	143
CF8F	L22M	0.06	1.23	0.80	19.75	9.50	1.40	0.11	0.120	0.028	0.067	0.028	Se 0.25	2075°F W. Q.	1.80	161
CF8M	L22XM	0.06	1.00	0.71	19.56	10.56	2.60	0.09	0.014	0.014	0.056	0.030	.....	2075°F W. Q.	1.79	160
CH20	L30	0.08	1.19	0.80	24.38	13.63	0.08	0.14	0.017	0.018	0.064	0.026	.....	1950°F Air	1.08	149
CH20M	L30XM	0.15	0.94	0.63	24.68	13.66	2.12	0.14	0.019	0.020	0.031	0.027	.....	1950°F Air	1.39	160
CE-30	L31	0.22	0.70	0.70	26.12	10.00	0.17	0.12	0.014	0.020	0.068	0.025	.....	As Cast	1.30	172
CK-20	L46	0.15	1.20	0.74	24.32	20.28	0.07	0.12	0.018	0.019	0.049	0.031	.....	1950°F Air	1.00	144
CN-7M Cu.	L33	0.07	3.35	0.77	19.82	22.16	2.50	1.97	0.008	0.011	0.056	0.032	.....	2075°F W. Q.	1.00	140
CN-7M Cu.	L34	0.06	0.90	0.66	20.50	28.30	2.40	4.04	0.014	0.010	0.059	0.023	.....	2075°F W. Q.	1.01	125

* Alloy Casting Institute designation.
**W. Q.—Water quench.

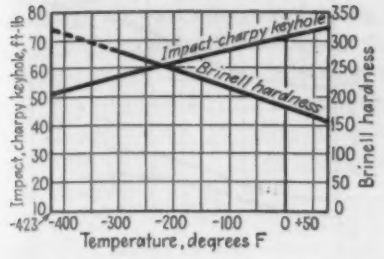

FIG. 1—Effect of testing temperature on average Charpy and Brinell hardness. Alloy is solution treated CF-8.

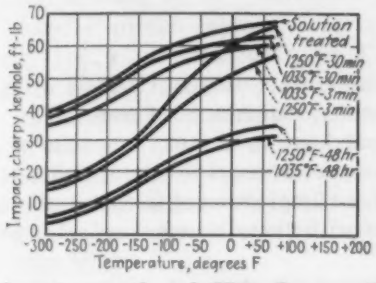

FIG. 2—Impact properties of CF-8 alloy as affected by reheating temperatures and testing temperatures. All samples originally solution treated at 2075°F.

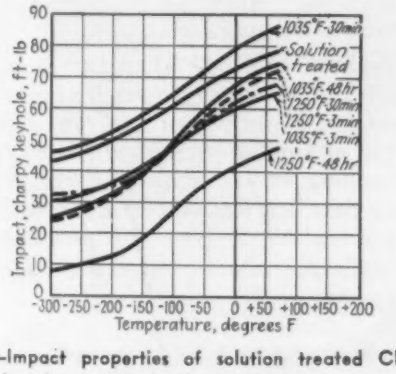

FIG. 3—Impact properties of solution treated CF-20 as affected by reheating temperatures and testing temperatures.

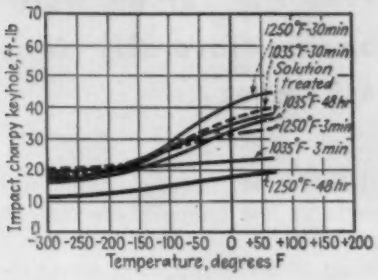

FIG. 4—Same as Fig. 2 and 3 but the alloy is CF-8C containing 0.71 pct Cb.

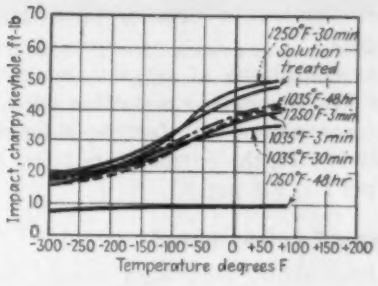

FIG. 5—Same as Fig. 2, 3, and 4 except alloy is CF-8T containing 0.68 pct Ti.

"CHARACTERISTICS OF STAINLESS CASTINGS"

1.—Ratio of austenite-ferrite or magnetic permeability and not related to impact strength at room or low temperature.

2.—Solution heat treatment is preferred for best impact and corrosion resistance.

3.—Welding without subsequent heat treatment can be performed, retaining sufficient impact resistance.

4.—Impact tests at very low temperatures can indicate minor structural changes caused by prior heating in critical temperature ranges.

TABLE II IMPACT PROPERTIES OF WELD METAL AT LOW TEMPERATURES*

Type	Composition C	Cr	Ni	Other	Condition	Impact-Charpy Keyhole Ft-Lb Room Temp.	−105°F	−320°F
308	0.07	20.0	10.0	....	As Welded	32	23	17
308	0.07	20.0	10.0	....	1950°F ¼ hr W. Q.	36	30	30
				Mo				
316	0.08	18.5	13.0	2.2	As Welded	30	26	18
316	0.08	18.5	13.0	2.2	1200°F 2 hr	32	26	14
316	0.08	18.5	13.0	2.2	1550°F 2 hr	28	21	13
316	0.08	18.5	13.0	2.2	1950°F ¼ hr W. Q.	34	29	22
				Cb				
347	0.08	19.5	10.0	10xC.	As Welded	25	25	19
347	0.08	19.5	10.0	10xC.	1200°F 2 hr	25	15	10
347	0.08	19.5	10.0	10xC.	1550°F 2 hr	29	16	14
347	0.08	19.5	10.0	10xC.	1950°F ¼ hr W. Q.	26	25	24
310	0.12	26.0	21.0	....	As Welded	36	30	24
310	0.12	26.0	21.0	....	1950°F ½ hr W. Q.	32	28	19

* Arcos Corp.

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"Properties of all weld metal compare favorably to similar cast grades . . ."

temperature impact level remains unchanged but impacts at low temperature indicate a significant loss.

The effect of temperature at 1035° or 1250°F for 48 hr has caused a 50 pct reduction of impact value at room temperature with values of about 5 ft at minus 3000°F. Obviously, the effects caused by temperatures variation and time, are related to definite structural rearrangements.

Similar conditions of impact sensitivity are noted in Fig. 3 covering a similar alloy, CF 20, heat but containing less ferrite. Magnetic permeability is 1.14, the composition being 0.11 pct C, 20.4 pct Cr, 9.4 pct Ni.

High impact values noted

This heat shows very high impact values in the solution treated condition, maintaining good impact properties at low temperatures. After 1035°F for 30 min, an improvement of impact value over solution treatment is realized, whereas, at the same temperature, but for 3 min duration, a lower level is again found at minus 300°F and a higher level at room temperature, when compared with the 3 min period.

Short time at critical temperature appears to lower impact properties, improving as time increases, then reversing itself as time at critical temperature is greatly extended. The impact test at room or very low temperatures seems to indicate that structural changes do occur in austenitic alloys upon reheating after solution treatment. Studies of microstructures do not always reveal these changes. Other methods of study are needed to verify and better understand the structural modifications indicated by the impact test.

Similar austenitic types of alloys are being stabilized with columbium or titanium. Low temperature properties of columbium stabilized 19-9 alloys, CF-8C, are given in Fig. 4 under similar conditions of treatment. Impact level at

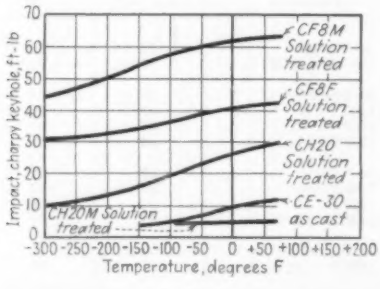


FIG. 6—Impact properties of five alloys as affected by testing temperature.

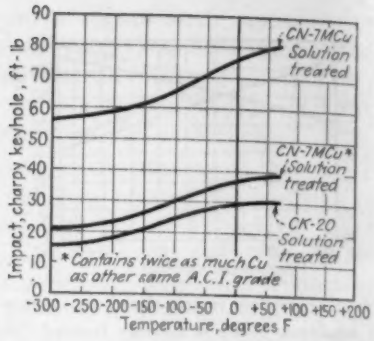


FIG. 7—Impact properties of three alloys, all solution treated v. testing temperature.

room temperature is about 50 pct of the same alloy without columbium. Three minute periods of critical heating at 1035° or 1250°F show a loss of impact at room temperature. At a 30 min interval, an improvement is found at room temperature with little change occurring at minus 300°F.

At 1035°F for 48 hr about the same level of impact is maintained as compared to the full solution treated condition. It may be termed stable, but at 1250°F for 48 hr, room temperature values are reduced about 50 pct and at low temperatures by about one-third.

A titanium stabilized alloy CF8T, is shown by Fig. 5. Initial impact properties at room temperature are higher than for the columbium series but of similar order at minus 300°F with corresponding effects of heating with temperature and time. Results of heating at 1250°F for 48 hr are low even at room temperatures, with only a moderate reduction of impact as low temperatures are reached.

Low temperature stability noted

The above tests on 19-9 type alloys are indicative of their general low temperature stability in the solution treated condition normally employed for low temperature equipment. Welding is possible without serious sacrifice of low temperature properties, even though post solution treatment cannot be employed. A solution treatment after welding is preferred for improved corrosion resistance.

Data on low temperature impact properties of all weld metal has been published by Arcos Corp. on some of the alloy typed under discussion. Table II covers the results of impact tests in the as welded condition only, and as solution treated or as otherwise indicated.

Type 308, 20 pct Cr-9 pct Ni has satisfactory impact properties in the as welded condition to minus 320°F indicating parts can be successfully welded without benefit of post heat treatment. Solution treatment as employed in all instances is beneficial. Impact properties of all weld metal compare favorably to similar cast grades, except that impact properties at

room temperature of the cast materials are generally higher. These, all weld tests, indicate that fabrication of parts is practicable.

Other austenitic cast alloys may be required for low temperature services where corrosion resistance requirements or other properties necessitate modification of alloying elements. Several of these austenitic types cast alloys are covered, as indicated by Table I.

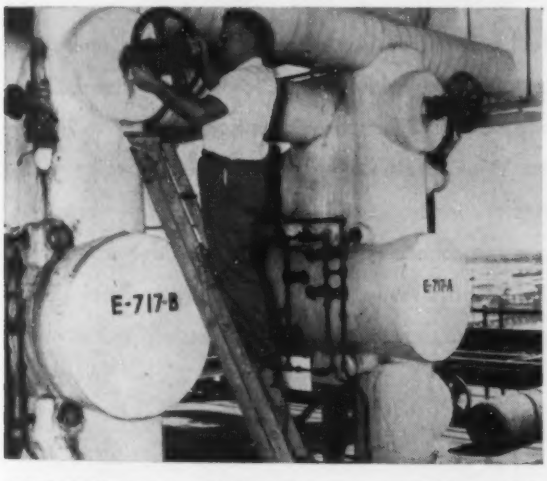
Fig. 6 includes five grades of austenitic type cast alloys:

CF-8M alloys contain 0.05 pct C, 19.56 pct Cr, 10.56 pct Ni, 2.8 pct No and indicates stability to minus 300°F, similar to comparable non-molybdenum bearing alloy.

CF-8F alloy is of the selenium bearing, free machining type, containing 0.06 pct C, 19.75 pct Cr, 9.5 pct Ni, 1.4 pct Mo, 0.25 pct Se. This alloy shows a lower level of impact throughout the ranges of temperature than the comparable alloy without free machining additions.

CH-20 alloy, containing 0.08 pct C, 24.38 pct Cr, 13.83 pct Ni has a lower level of impact than the 19-9 type alloys.

It may be considered a metastable type alloy which may contain varying austenite-ferrite ratios with only minor composition variation. Magnetic permeability, however, is relatively low—1.08, indicating only a small ferrite percentage. The amount of austenite present, therefore, is not a criterion of impact level.



CAST VALVES and auxiliary equipment, cast of Aloyco 19-9, are shown in use at Dow Chemical Co.'s light hydrocarbon plant. In producing ethylene, equipment operates at —150°F.

STAINLESS austenitic castings being pressure tested before assembly into circulating pumps of butyl rubber reactors. Reactors, to be installed at Esso Standard Oil Co. plant, Baton Rouge, La., operate at temperatures below —150°F.

CE-30 shows impact results on as cast metal containing 0.22 pct C, 21.6 pct Cr, 10 pct Ni. Impact strength at room and sub-zero temperatures is low. Magnetic permeability is 1.30. CH-20M alloy with 0.15 pct C, 24.7 pct Cr, 13.7 pct Ni, 2.1 pct Mo has a magnetic permeability of 1.39. Impact tests at room and low temperature show the alloy to be brittle.

Fig. 7 shows low temperature impact values of two highly alloyed corrosion resistant cast alloys, and a 25 pct Cr, 20 pct Ni heat resistant alloy. All are virtually austenitic, with permeability values of about 1.00.

The upper two curves represent two sulfuric acid resistant type alloys of the CN-7M Cu type. The CN-7M Cu alloy shows very high impact values at all temperatures. Alloy, CN-7M Cu, containing 3.3 pct Si, Cr-Ni-Cu-Mo, shows lower initial room temperature impact values but with acceptable low temperature properties.

The CK-20 alloy, containing 0.15 pct C, 24.3 pct Cr, 20.3 pct Ni shows a lower impact level at minus 300°F. These alloys again indicate that a full austenitic structure or low magnetic permeability value is not a criterion of impact strength.

NEW BOOKS

"General Report, Iron and Steel Committee." The committee report of the Fourth Session, Geneva, 1952 of the International Labor Office surveys the steel industry on an international basis. Reports are included on supply and demand, modernization and development, and labor conditions. International Labor Office, 1825 Jefferson Place, N.W., Washington 6, D. C. $1.50. 106 p.

"Mineral Forecast 2000 A.D." by Edward Steidle. Wars and expanding production have eaten deep into our mineral reserves. Natural resources must more and more be husbanded with an eye to the future. Dr. Steidle poses the problem of how best to use our diminishing mineral treasures by application of best technical skill and planning. Pennsylvania State College, State College, Pa. $3.00. 216 p.

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Save steel, machining time—

HOT CUPPING, COLD DRAWING

Replace machining operations

By G. F. Burnley
Oakland, Calif.

Savings in critical alloy steel and elimination of costly machining operations resulted from use of hot cupping and cold drawing to make 81 mm shells at Rheem Mfg. Co., Richmond, Calif. Billets are induction heated at 2000°F and hot forged in a 600-ton Ajax forging press. Only nose and tail machining are required where complete machining of OD was previously necessary. Proper pickling and use of a phosphate coating simplify forming operations. A bar-tube conveyer is used to pass shells from press to press. Final operations include cleaning, oven drying, spray painting, inspection and packing.

A hot cupping and cold drawing process for fabricating 81 mm shells at Rheem Mfg. Co., Richmond, Calif., has produced satisfactory results months sooner than could be expected by conventional methods. The method, developed by Rheem engineers, offers savings in critical material and in machining time.

Raw stock now consists of SAE 1010 steel billets 20 ft long by 2½ in. in diam as compared with other methods which require a steel 50 pct higher in manganese content or spheroidized steel plate.

Automatic saws cut forging blanks of 3⅛ in. which are induction heated, 200 kw, to 2000°F. Hot forging is done in a 600-ton Ajax forging press. This is a backward extrusion accomplished in 3 stages to form a close approximation to the finished dimension of the basic internal shell contour. By close control of speed and temperature, wall thickness is held to a tolerance of —0.015 in., important in subsequent drawing operations. This step is specifically engineered to minimize costly machining operations.

After slow air-cooling in baskets, forgings are shot blasted to remove scale and trimmed to length in Hepburn cutoff lathes. The forgings are then placed under a press where a slug is punched out of the nose. This slug is later formed as a tail plug by cold extrusion. Next, an industrial pickle and rinse again removes

THE AUTHOR—Mr. Burnley, author and teacher and graduate of the University of California, has for some time reported and interpreted for national metalworking magazines the progress of new machinery and production methods on the West Coast.

scale and prepares the metal for a phosphate coating. This coating, nearly iron-free and highly absorbent, functions as a matrix for a special soap which reacts chemically to supply a heat resisting lubricant which bonds closely to the metal of the shell.

The pickling and phosphate coating when correctly applied is instrumental in obtaining the proper flow of metal during deformation. Large reductions in area are permissible with proper lubrication of shells. Rheem engineers have experienced exceptionally high reduction before annealing thus supporting the contention of lubricating experts that the commonly acknowledged figure of 68 pct can be well surpassed.

At present there are three draws, a cold nose, and a taper operation. The first draw can be eliminated after the developmental work is completed. This extra draw was needed to overcome scrap losses due to development work. Drawing operations are conventional ironing operations similar to the type used in making brass and steel cartridge cases and shells from spheroidized steel plate.

Bourrolet diameter is held to within 0.004 in. while the die establises all external dimensions. By using a small additional pressure on the working stroke, parts are shunted from one press to another via a cylindrical conveyer made up of a cage-like system of longitudinal steel bars commonly called a "bar-tube" conveyer. Rheem Co. technicians feel the system has resulted in a tremendous saving in parts handling.

Shells are stress relieved, cleaned again and annealed. Then, at a multispindle drill press retooled for automatic operation, tail boring and facing is done on 4 bodies at once. Each part is held in a hydraulically operated chuck. Degreased next, four at a time, shells are placed in a fixture which raises them into induction heating coils. Here, in 15 sec at 1400° to 1500°F, a silver solder ring placed in a prepared groove fuses the tail plug to the shell body.

Nose turning and threading operations are performed on a multispindle New Britain automatic chucking machine. Tail machining and bourrolet grooves are done on Hepburn shell turning lathes. They are conveyed through 5 stages which combine cleaning and bonderizing. Shells are oven dried, spray painted, Army inspected and packed for shipping.

Three pounds less of a lower grade steel per shell is require using this process. This metal is not, at present, in critical demand. Through controlled cold working and stress relieving the steel retains sufficiently high metallurgical and physical properties.

All external dimensions are established in the pressing operations and fewer machine tools are needed. Only the machining of the nose and tail is required as contrasted with the complete machining of the outside dimension of the shell in hot forging. Smooth external surfaces are reported to improve the shell ballistically.

MULTI-SPINDLE drill press adapted to bore and face shells simultaneously while held in hydraulically operated chucks. Fence keeps machine safe, clean. Handling containers are in foreground.

Chasing chips pays off—

RADIOACTIVE TOOLS PERMIT fast tool wear studies

By M. E. Merchant, Hans Ernst and E. J. Krabacher
Cincinnati Milling Machine Co.
Cincinnati

To speed up machinability studies and other tests depending on measurement of tool wear, measure the rate of wear over a short time, not total wear. This can't be done accurately by conventional measuring of tool flank wear. It can be done by a new method using radioactive tools. Material worn off tool adheres to chips, can be measured by a Geiger counter. Tests can be made in 1/25 the time needed for conventional tests.

Studies of machinability and the machining process which depend on tool wear measurements can be made accurately in 1/25 the time required by conventional means, through use of tools made slightly radioactive by exposure in an atomic pile.

The conventional laboratory method of tool life testing usually consists of machining with a cutting tool, until complete failure occurs or to a predetermined amount of flank wear measured with a microscope. In either case the test requires a great deal of time and material. It involves considerable cost in order to obtain a relatively small amount of tool life data. Attempts to accelerate these tests, as by employing abnormally high cutting speeds, usually yield results which do not agree with practice.

The rate of wear of a cutting tool, when machining under normal conditions, is so low that to measure it by ordinary means requires a long period of time. In order to determine the rate of wear, observations have to be made over a period of time nearly as long as that required to reach a flank wear of 0.030 in., which corresponds to tool failure. But rate of wear can be determined with radioactive tools.

When working with radioactive materials with a level of activity of the tool tips used for this investgation, some protection is necessary and some precautions must be taken. In addition to direct shielding, protection is provided by controlling the distance between the worker and the radioactive material, and by limiting the time of exposure.

Test equipment and procedures for the radioactive tool wear studies were designed to give more than adequate protection from beta and gamma radiation. As a result, the average dosage regularly received during the use of the radioactive tools in the investigation has been far below the tolerance level. The maximum amount of radiation received by a worker in any single week has been 0.011 roentgen. This is 1/30 of the permissible tolerance.

The cutting tools used are small tool bits approximately 5/16 in. square by 3/32 in. thick. These are finish ground to shape before they are irradiated in an atomic pile to make them radioactive.

All cutting takes place within a completely enclosed cutting chamber mounted on the table of a knww and column type milling machine. The setup is shown in Fig. 1. The steel chamber is polished and chromium plated to render it easily decontaminable. The chamber walls are of sufficinet mass to protect the operator completely. The chamber contains its own cutting fluid circulating system which supplies two nozzles, one on either side of the cutting tool. The cutting fluid is returned, by means of small slots, to a reservoir beneath the chamber.

A tubular workpiece is used. It is held in a

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draw collet adapted to the spindle of the milling machine, and enters the cutting chamber from the rear, through a seal. Tests are made by inserting the tool holder with the cutting tool into the cutting chamber, clamping it securely and cutting on the end of the tubular workpiece. A wide range of feeds and speeds is available to give desired cutting conditions. After the cut has been made the resulting chips, which have been collected in a stainless steel wire mesh basket, are cleaned, dried and weighed preparatory to counting.

Measurement of the activity of the chips for determining the rate of tool wear is carried out in a counting chamber. Both beta and gamma counting techniques have been investigated. Gamma counting was found to be satisfactory for wear rate determinations. The beta counting technique has been used for special studies of individual chips.

For wear rate measurements the chips are placed in a Marinelli beaker for counting the number of disintegrations per second. This contains a central cylinder into which a Geiger tube may be inserted without coming in contact with the chips. The automatic scaling circuit may be set to count for a predetermined number of counts before it shuts off. The normal time required for counting to a $\pm$ 2½-pct accuracy is from 2 to 4 min. The total counts are divided by the counting time to give gross counts per minute.

The background counts per minute recorded by the scaler due to stray radiation only, no source being present, are subtracted from this value to give net counts per minute. This value, in turn, is divided by the weight of chips in grams to give the final value of counts per minute per gram of chips. This is a direct measure of the rate of tool wear.

The results of a series of cuts taken on AISI 8650 steel, starting with a sharp tool, are shown in Fig. 2. Here the total radioactivity of the chips, which is proportional to the amount of radioactive tool material present on the chips as accumulated throughout the series of cuts, is plotted against tool wear as measured on the flank of the tool with a microscope in the conventional way. Measured radioactivity correlates with the wear measurements made with a microscope.

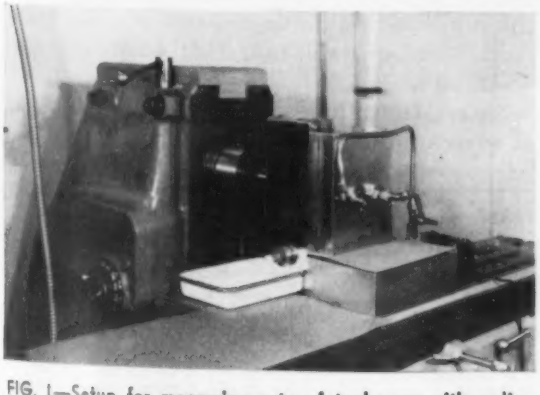

FIG. 1—Setup for measuring rate of tool wear with radioactive tool. Cutting is done in steel container to protect personnel. Container has own coolant system. Tool is stationary, with workpiece mounted on milling machine arbor.

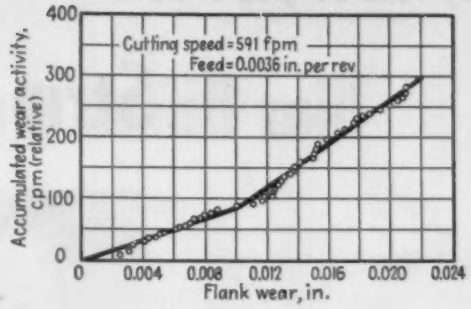

FIG. 2—Plot of accumulated activity of wear products on chips, against tool wear as measured on the tool flank in the conventional manner, shows quick radioactivity method gives same results as longer, more costly, measurement on tool flank.

The scattering of the experimental points is due not nearly as much to variations in the radioactivity measurements as to the cascading of the gross wear on the flank as measured with the microscope. The cascading effect is well known to be one of the important factors which often prevent the obtaining of reliable measurements of the rate of tool wear from short time tests, covering only a small portion of the wear curve, when using conventional methods.

A plot of the radioactivity of the chips as a function of time exhibits, after initial break-in of the sharp tool during which wear is very rapid, is an essentially linear relationship with practically no cascading. It is evident therefore that the radioactivity of the chips is a valid measure of tool wear. Thus an accurate measure of the rate of tool wear can be obtained by averaging the values for the activity of the chips obtained from only a few runs of a few seconds duration each.

A comparison has been made of the relative cutting time required to conduct a similar series of tool life tests by the conventional method and by the radioactive tool wear method. On a series of tests for which the cutting speed was 75 sfpm and the average tool life was 31.35 min, for 8 runs total cutting time was 250 min. The cutting time required to make 8 tool life determinations by the radioactive tool wear method at the same cutting speed would be 10 min.

In addition to the total cutting time involved in making the tests with the radioactive tool wear method, there would be time involved in handling and in the radioactivity measurements. However, this is well offset by the time involved in tool grinding and set-up with the conventional tool life testing method.

This article is based on the authors' paper presented at the American Society of Mechanical Engineers Semi-Annual Meeting, June, 1952.

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Baby rolls do giants' work—

Strip rolled to 0.0002 in.

By Robert L. Stockus
Sales Manager
Armzen Co.
Waterbury, Conn.

Increasing industry demand for very thin metal strip has given rise to a new and unique rolling mill. The Armzen Co., Waterbury, Conn., has engineered a new small Sendzimir mill, ZR32-4 which will cold-roll electrical alloys to 0.0002 in. A 70-30 brass 0.008 in. strip has been reduced to 0.0003 in. in six passes. Number of passes required to reduce stock depends on the metal being rolled. Work rolls, 0.250 in. in diam are supported by inside and outside backing and drive rolls. These are supported by castor rolls within a solid housing. Oil fills the rolling chamber during operation. For thicknesses under 0.005 in. a secondary lubrication method eliminates telescoping of the extremely thin strip. Proper tension is maintained by a system of tensiometers. Smaller work rolls eliminate the need for intermediate anneals. Work rolls can be changed in 1 min.

Steadily increasing demand in recent years by the metalworking and electronics industries for highly work hardened alloys and metals of 0.0002 in. and thinner has focused attention of rolling mill engineers on development of mills capable of producing these ultrathin materials at low cost.

Efficiency of small work rolls has challenged rolling mill designers. Some success was attained with mills built along principles outlined by Rohn and Steckel. More recently, modifications of 4-high and cluster designs have been effective. But problems of adequate torque transmission, positive work roll positioning and mill rigidity together were solved only by the Sendzimir mill.

The new, miniature Sendzimir cold mill recently engineered by Armzen Co., Waterbury, Conn., provides the efficiency of the larger mills and meets the need for a fast small mill capable of high output of very thin strip. The mill will take coil stock up to 0.010 in. thick and reduce it to 0.0002 in. Number of passes depends on the material being processed.

Two of the small mills, the ZR32-4, have been built. One of these is shown on the test floor of the Waterbury Farrel Foundry & Machine Co., Fig. 1. One mill was built for Arnold Engineering Co., of Marengo, Ill., and the other for Fansteel Metallurgical Corp., North Chicago, Ill. A third is now being built for English Electric Co., London, England. The mills, of the 1-2-3-4 type, are similar in most respects to the large Sendzimir mills.

Sendzimir mills are in operation rolling materials up to 80 in. wide. Typical performance for larger Sendzimir mills is shown in Table I.

By driving four backing rolls, torques as high as 10 hp per inch of width per 100 fpm base speed, Fig. 2, are possible. Roll crossing or drifting has been eliminated by the method of roll support, Figs. 3 and 4, incorporated in the mill. All rolls are inclosed in a one-piece steel housing similar to that shown for the 49-in. mill, Fig. 5.

Successful rolling of strip stock to 0.0002 in. at speeds up to 300 fpm from a starting thick-

TABLE I
WITHOUT INTERMEDIATE ANNEAL

	Width in in.	Reduction	Passes
18-8 Stainless	36	0.125 to 0.025	7
17 Cr Stainless	36	0.137 to 0.008	12
70-30 Brass	25	0.075 to 0.0045	8
52S Aluminum	25	0.109 to 0.009	5
2S Aluminum	25	0.060 to 0.005	2
3 pct Silicon	12	0.013 to 0.0018	3
Low Carbon	31	0.072 to 0.010	4

on new small mill

FIG. 1—Test floor view of the ZR32-4 miniature cold mill by Armzen Co., Waterbury, Conn. Mill reduces strip to 0.0002 in.

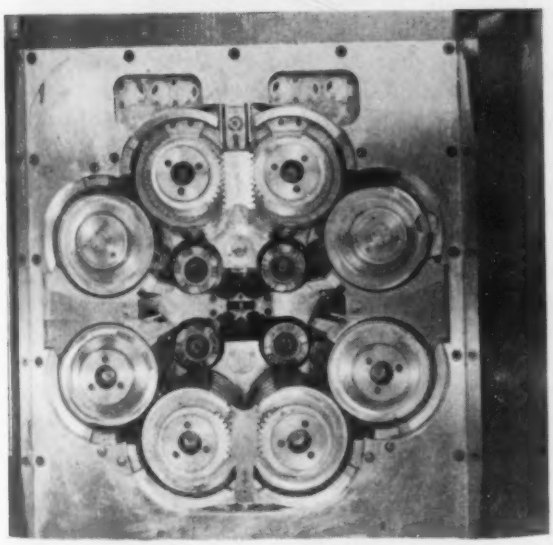

FIG. 2—Interior showing backing assemblies and four driving spindles on a 37-in. mill.

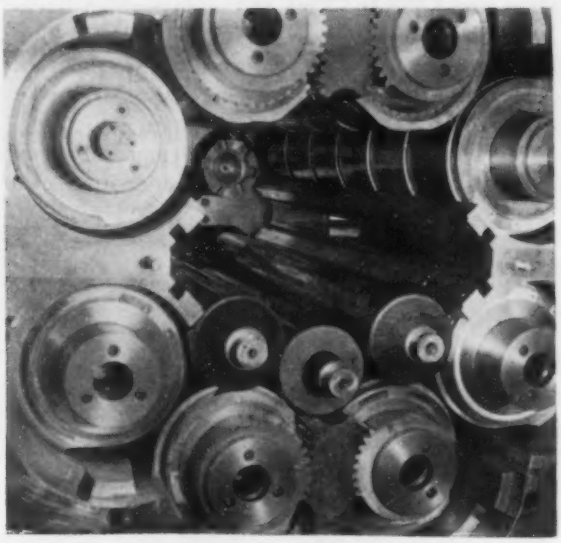

FIG. 3—Nesting of 2nd intermediate rolls is shown in this closeup of a 37-in. Sendzimir mill.

ness of 0.010 in. required solution of a number of special problems.

Work rolls nest between backing rolls as shown in Fig. 6. Backing rolls are supported in the small mill by assemblies consisting of roller bearings and saddles alternately mounted on nonrotating shafts. Rolling load is transmitted uniformly across the entire width to the backing bearings which in turn transmit the load through the saddles to the 1-piece steel housing. Precision Methods and Machines, Inc., which supplies the backing assemblies for all Sendzimir mills, has developed a technique of low cost production for these essential elements.

Electrical drive equipment on the new small mill includes a 7½ hp mill motor and two 3 hp motors, one for each reel. The reversing strip mill control, designed by Westinghouse, provides a constant tension control, at preset

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"Tension control . . . has been solved by development of a system of . . . tensiometers . . ."

values ranging from 400 lb maximum to 10 lb minimum at speeds up to 300 fpm.

Shorter, heavy columns, Fig. 5, carrying the smaller roll separating force resulting from the small work rolls, reduce the stretch inherent in long housings and result in a mill rigid enough to iron out initial variations.

The problem of proper tension control, magnified where very thin materials are rolled, has been solved by development of a system of controlling tensiometers. One is located on each side of the mill, inboard of the winders.

Strip tension is balanced against an air cylinder loaded by a pressure control valve. Air pressure corresponds to pounds pull on the strip. The electrical system regulates reel motor speed to keep the tensiometer linkage in a neutral position. Inertia and draft compensation are not required since the electrical system is concerned only with balancing the air loading on the tensiometers, Fig. 7.

Work roll diameter, Fig. 6, is 0.250 in., while the inside intermediate roll diameter is 0.531 in. Drive and outside intermediate roll diameters are 1.078 in. Two of the assembled backing units are shown in Fig. 8. The 24 backing bearings are 1.006 in. wide and 1.875 in. OD. An assembled backing-bearing unit for an 80 in. strip mill is shown in Fig. 9.

Winders are 10 in. solid steel drums, mounted on the shaft extensions of the winder gear motors. Hand operated grippers hold the ends of the strip. Maximum coil diameter which may be handled on the miniature mill is 16 in. Maximum strip width is 4¼ in.

TABLE II

REDUCTION SCHEDULES 4 IN. STRIP

Pass	Thickness in in.	Pct Reduction
3 Pct Silicon Steel		
0	0.010	
1	0.0065	35.0
2	0.0048	26.0
3	0.0036	25.0
4	0.0027	25.0
5	0.0020	26.0
6	0.0014	30.0
7	0.0010	28.5
8	0.00075	25.0
9	0.0005	33.3
70-30 Brass		
0	0.008	
1	0.005	37.5
2	0.0035	30.0
3	0.0018	48.6
4	0.001	44.5
5	0.0005	50.0
6	0.0003	40.0

The lubricating system is basically similar to that used on the larger type of mills. Mineral oil is continuously recirculated and filtered. The mill lubricating system has a capacity of 4½ gpm. Lubricating tank capacity is 200 gal., the reservoir being located in the mill base.

Oil enters the mill through the backing shafts, passes through the backing bearings and floods the interior of the mill. For thicknesses below 0.0005 in., the main lubricating system is shut off and an entirely new method of lubrication is used. This eliminates the possibility of the coil telescoping because of heavy oil film. Strip wipers which might tear the thin strip are not necessary.

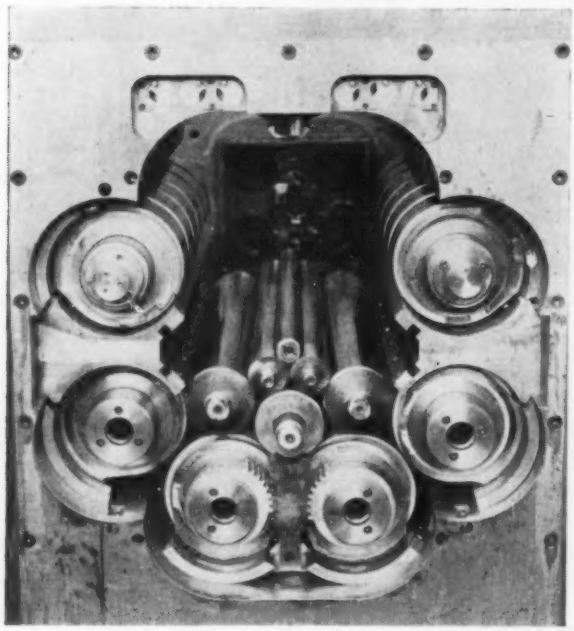

FIG. 4—Rolls nesting in lower half of 37-in. mill are positively positioned to prevent misalignment.

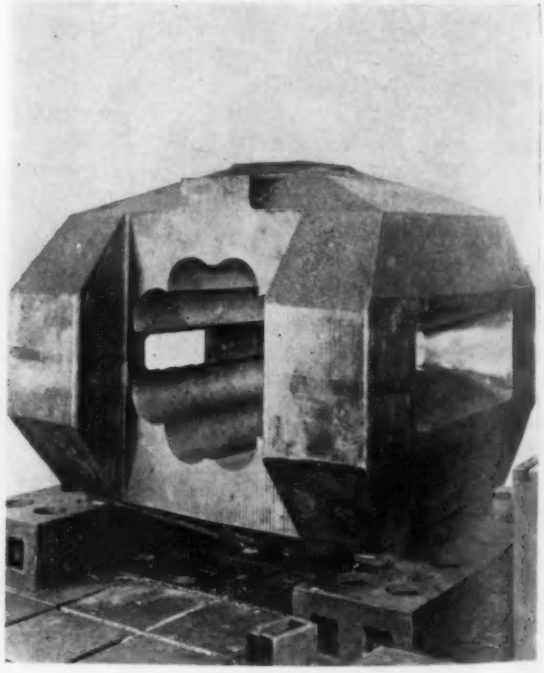

FIG. 5—Housing for rolls of 49-in. mill.

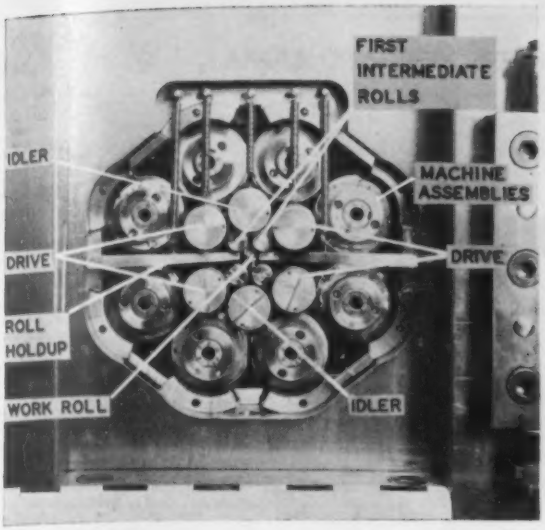

FIG. 6—Roll arrangement of the ZR32-4 cold strip mill. Working rolls, center of cluster, are 0.250 in. in diam.

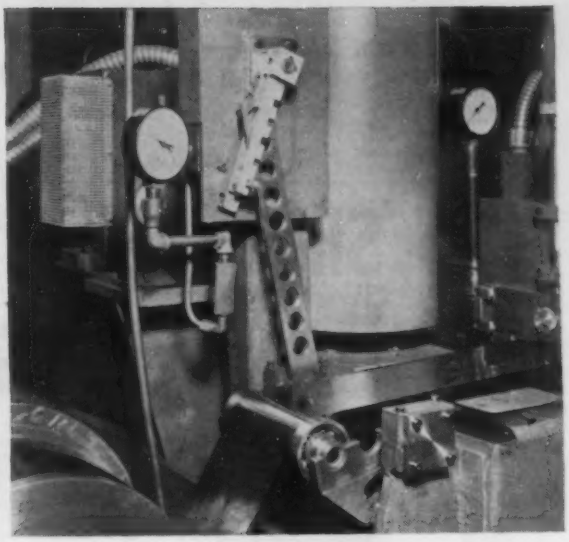

FIG. 7—Proper tension on the metal strip is maintained by tensiometers specially designed for the mill.

FIG. 8—Two of eight backing assemblies for the ZR32-4.

In operation, the mill is capable of reducing a 70-30 brass strip 4 in. wide, thickness 0.008 in., to 0.0003 in. in six passes. Reduction per pass varies, Table II, from 30 to 50 pct. First pass reduction is 37.5 pct. A 3 pct Si steel may be reduced from 0.010 to 0.0005 in. in nine passes with reduction ranging up to 35 pct. Present experience indicates 0.00015 in. will be the limit for ZR32-4 mills. A smaller mill employing 0.100 in. diam work rolls is now being designed.

Sendzimir mill construction insures uniformity of thickness, both end to end and across the strip width. Shape adjustments while rolling are possible, insuring flatness in the strip. A big factor in lowered strip production costs is the elimination of intermediate anneals. Small rolls, because of the smaller roll bite, are subject to less flattening and consequently can continue to reduce the strip even after the metal has become highly work hardened and very thin.

Other factors contribute to lower production costs. Work rolls may be changed in 1 min to permit use of newly ground rolls for finishing passes. Costs of the mill proper are lower than for other types of mills. Lighter foundations, cranes and buildings are needed to accommodate the lighter mill. A smaller roll grinder is required for roll maintenance.

Close control of strip thickness is simplified through use of a thickness gage energized by a strontium isotope. The gage was developed by engineers of Industrial Neucleonics Corp.

For a further description of this strip gage see "Beta Gage Measures Strip Thickness," The Iron Age, June 19, 1952.

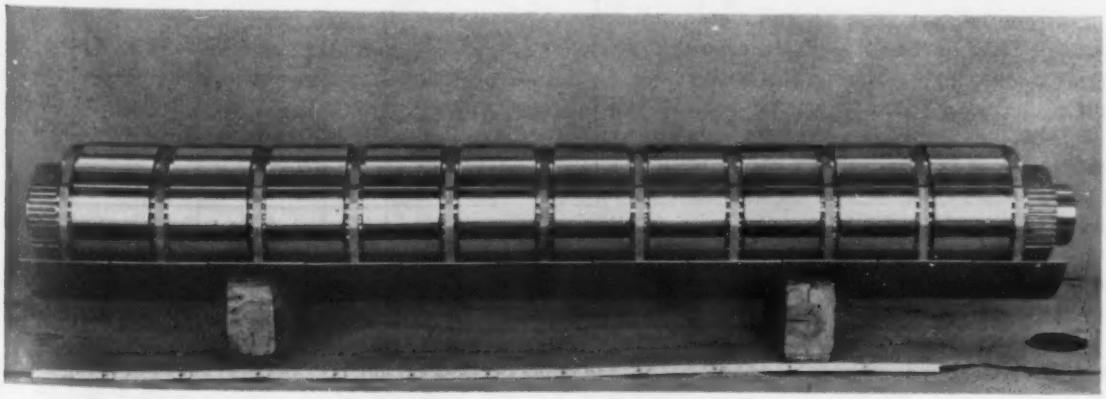

FIG. 9—Backing assembly for 80 in. strip mill.

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Pennies from heaven—

Shake those bulk UNLOADING PROBLEMS

By T. S. Abbott
Application Engineer
Processing Machine Dept.
Allis-Chalmers Mfg. Co.
Milwaukee

Hopper car shipments of bulk materials can cost you a lot of money if not properly unloaded. Just to install a car shaker is not enough as different materials flow differently depending on angle of slide and their specific weight. Weather conditions and speed of shaking are also important factors which should not be overlooked. Gravity will only unload a car until the angle between the horizontal and top surface of the material equals the angle of slide. From there on it has to be dug, pushed, pulled or shaken.

Practically all hopper cars used to transport bulk materials needed in the metal industry are built with the steel plate floor slanted at an angle of 30°. This means that bulk materials, under ideal conditions, with an angle of slide of 30° or less will slide out of the hopper car completely under the influence of gravity. But what about all those materials that have a slide angle greater than 30°?

Gravity will cause only enough material to flow out of the car until the angle between the horizontal and the top surface of the material is equal to the angle of slide. The material that remains in the space between the top surface of the material and the 30° steel plate floor will not flow out of the car under the force of gravi-

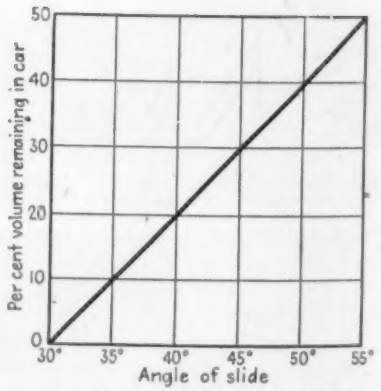

FIG. 1—Percent volume remaining in the hopper car after gravity has removed its share.

TABLE I

ANGLE OF SLIDE V. WEIGHT OF BULK PRODUCTS

Description	Angle of Slide (Degrees)	Specific Weight (#/Ft³)
Alumina, sized or briquette	22	65
Alumina, fine, granulated	35	55
Aluminum Hydrate, ground	34	13½
Aluminum Sulphate, granular	32	54
Ammonium Sulphate, damp, granulated	45	40
Ash, black, ground	27	105
Ash, volcanic, powdered	45	45
Ashes of bituminous coal	40	35–45
Ashes, damp	50	40–50
Babassu Nuts, ground	40	45
Bagasse, wet sawdust	45	4
Barytes, granular	30	144
Bauxite, calcined (granulated without dust)	26	70
Bauxite, ground, dried	35	68
Bauxite, mine run	31	85
Bentonite, pulverized	42	50
Bones, animal, pulverized	50	50
Bone Char, ground	35	40
Calcium Bichromate, granular	25	62
Calcium Carbide, spent, powdered	45	139
Calcium Oxide, powdered	43	27
Carbon, ground	21	50
Carbon Coke, crushed, sized	28	30
Chalk, precipitated, powdered	45	18
Charcoal, bone (carbonated granular)	27	60
Charcoal, wood pulp, granular	35	26.4
Chips, wood	22	15–30
Cinders (coal, ashes and clinkers)	35	40–45
Cinders, blast furnace	35	57
Clay, dry in lumps, loose	35	40–100
Clay, blended for tile, 11% moist, powdered	45	45
Clay, fire, powdered	45	25–60
Clay, pulverized, fire brick	35	100
Coal, anthracite, broken of any size, loose	22	52–57
Coal, anthracite, chestnut	22	46
Coal, bituminous, minus ½" slack dry	29	40–50
Coke, pulverized	34	25
Coke, petroleum, crushed	27	33–36
Copper Oxide, powdered	40	190
Copper Sulphate, ground	31	75
Coke, ¾" to 0"	30	6
Cryolite, ¼" to 200 mesh, crushed	32	52
Cullet (scrap glass sized)	25	80–120
Dolomite, pulverized	41	46
Dust, flue, blast furnace	45	40
Dust, limestone	38	55–65
Earth, fuller, raw	35	42
Feldspar (crushed)	32	100
Glass Batch, average mix	45	100
Malt, spent, dry	28	10
Bran	38	16–26
Corn, field (on cob)	20	45
Gravel	30	120
Green Stone Trap, quarried in loose piles	35	107
Gypsum	45	142
Gypsum in irregular lumps	30	82
Gypsum, ground	40	56

Description	Angle of Slide (Degrees)	Specific Weight (#/Ft³)
Ilmenite, granulated	31	148
Ilmenite, fine ground	40	120
Iron Oxide Pigment	40	25
Kalsomine (powder)	42	32
Lead Silicate, granulated	40	230
Lead Sulphate, basic pulverized	45	184
Lime, briquette	26	60
Lime, burned, pebble (sized)	30	53
Lime, fine (spent dry carbide)	40	45
Limestone, pulverized	42	85
Limestone, mixed sizes	35	105
Limestone, coarse, sized	25	98
Magnesium Sulfate (Epsom salts), crystals	25	55
Mica, ground	38	13½
Molybdenite Ore, powdered	40	107
Nitrate of Soda, pellet type, granular	24	68
Phosphate, Florida #20 mesh, air cleaned	27	93
Pumice, pulverized	45	40
Rock, phosphate, pulverized	40	60
Rubber, scrap (ground)	35	23
Salt Rock, crushed, sized	25	75
Sand, mine run	35	90–120
Sand, coarse sized	30	90–100
Sand, very fine	32	90–110
Sand, core	39	65
Sand, voids full of water	45	110–130
Silica, flour	45	80
Slag, furnace, granulated	25	122
Slag, Birmingham	25	82
Slate, fine ground	35	82
Slate, granules, flaky	28	87
Soapstone, fine ground	40	60
Soda Ash, light	37	25–35
Soda Ash, dense	32	68
Soda Ash, briquette	22	50
Sodium Antimonate, crushed	31	49
Sodium Nitrate, granular	24	68
Sodium Sulfite, powdered	40	96
Sodium Sulfate (fine and lumps)	31	88
Stucco (tubed and untubed), powdered	36–38	50
Sulphur, coarse	32	76
Talc, micaceous granulated	36	82
Tin Oxide, ground	35	100
Tripoli (powdered)	40	80
Beets, shredded sugar	31	7.6
Copra, medium sized pieces	20	33
Copra, expeller cake, chopped	20	29
Walnut Shells, ground, 320 mesh	55	21
Sawdust, dry	38	10–30
Wool, mineral	30	20
Zinc Calcines, powdered	54	85
Zinc Oxide	45	20
Zinc Oxide, leaded, ground	50	20
Zinc Ore, roasted, granular	38	110
Zinc Sulphate, powdered	44	72
Zonolite, fine, granular	30	7

Taken from Stephens-Adamson Mfg. Co. Aurora, Illinois

ty, but will require some other externally applied force to cause it to flow.

Table I is a listing in tabular form of aseries of products that may be transported in hopper cars. After each of the products listed there is given the angle of slide, which is the angle to which the material must be tilted from the horizontal before the material will slide off due to the force of gravity. Also listed is the specific weight for each product. All of the data listed is considered to be under ideal conditions unless otherwise noted. Ideal conditions means that the material is sized, there is little or no moisture and no packing.

To illustrate the full meaning, Table I, has been expanded to show graphically the percent of volume of material that remains in the hopper car after the force of gravity has removed its share of the load. A typical 50 ton car, which has a volumetric capacity of 2100 cu ft when loaded full to the eaves was chosen. Based on the dimensions of the car and the angle of slide over 30° the volume of material remaining in the car was computed and then divided by the volumetric capacity of 2100 cu ft, which resulted in a percentage of full load remaining in the car. The results of these calculations are shown in Fig. 1. Note that as the angle of slide increases one degree, the percentage of load remaining in the car increases very close to 2 pct.

When conditions vary from the ideal, the angle of slide increases. This in turn increases the volumetric percentage of full load that will remain in the car after gravity has done its work. This is significant in view of the fact that many of the materials listed in Table I as having a slide angle of 30° or less under ideal conditions, will have a slide angle of 30° or more when the ideal conditions are modified. Packing in transit, moisture, and partial freezing are a few of the conditions that will increase the angle of slide. For example, when absolutely dry, bituminous coal will slide at an angle of 29°, but when damp the angle of slide increases

"A car shaker involves . . . a considerable saving . . . in man hours required to empty a car . . ."

to 40°. In winter there is the danger of a hard enough freeze to prevent any material from sliding, which would necessitate thawing before the material can be removed through the hopper.

Fig. 2 represents material in a hopper car under the various conditions as noted. The shaded area in the car represents the amount of material remaining after gravity has done its work and which must be removed by either manual or mechanical means. Unloading personnel would have to bang the sides of the car or actually climb into the car and dig or chop the material loose. This method is, of course, dangerous and involves considerable time. A mechanical method, such as a car shaker, involves the use of only one man at the controls—away from all danger and also a considerable saving in the amount of man hours required to empty a car.

How unloading was figured

Fig. 1 still does not give a complete picture of just how much is involved in unloading from a hopper car the mateial that gravity does not remove. Therefore, the figures obtained from the graph in Fig. 1 were expanded on a weight basis. The calculations involved three variables: (1) the specific weight (lb per cu ft) of different materials, (2) the slide angle, (3) the percentage load remaining in the car. A summary is given in Table II.

Here is a brief explanation of how the calculations were made and by using the same method any of the materials given in Table I can be put through the same process. The same hopper car was used, which has a volumetric capacity of 2100 cu ft. A product was then selected from Table I and its specific weight noted. Blast furnace cinders which weigh 57 lb per cu ft was chosen as an example. Multiplying 2100 cu ft by 57 lb per cu ft gives a total load in the car, when full and level with the top, of 119,700 lb. From Table I, blast furnace cinders have a slide angle of 35°. Taking this figure over to Fig. 1 it is found that with a slide angle of 35° there remains in the hopper car 10 pct of the load. By multiplying 119,700 lb by 10 pct the weight of material remaining in the car is determined. The amount in this case is 11,970 lb, which is equal to 5.9 short tons. Thus, under ideal slide conditions, almost 6 tons of blast furnace cinders would have to be removed by either human or mechanical means after gravity has done its work.

Another factor which must be considered before drawing any conclusions is the weight limit of the hopper car. A car may have a volumetric capacity of 2100 cu ft with a nominal load limit of 100,000 lb and a maximum load limit of 129,100 lb. On the basis of the nominal load limit (100,000 lb) any material weighing more than 47.6 lb per cu ft should not be loaded full and level with the top of the car, and on the basis of the maximum load limit (129,100 lb) any material weighing more than 61.5 lb per cu ft should not be loaded full and level with the top of the hopper car.

What's left in the car?

This fact has a very interesting effect on the results obtained for some of the materials. If the car could not be loaded full and level, there would be a smaller total volume of material in the car. Therefore, less material would flow out by gravity and by the same token there might be less material remaining in the car, depending upon the angle of slide and the slide conditions. However, because of the higher specific weight of the material there might be a higher total weight of material remaining in the car than there would be for a lighter product that could completely fill the hopper car.

Table II is an analysis of what happens when the slide angle or specific weight varies. The same range of specific weights was used with varying slide angles, therefore, the effect that varying either the slide angle or specific weight has on the total weight of material remaining in the car can be quickly determined.

The car shaker, when set on the eaves of the car, will cause the bottom sheets to vibrate through a small amplitude. This vibration

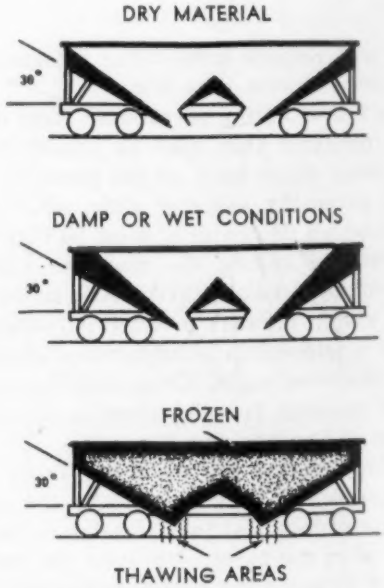

FIG. 2—Weather conditions are a vital factor. Above illustrates normal unloading by gravity for the same material under three different conditions.

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TABLE II
HOW MUCH MATERIAL STAYS IN THE CAR?

Slide Angle (Degrees)	Pct Volume Remaining in Car from Figure 1	Specific Weight (#/ft³)	Weight Remaining in Car (Lbs)
33	6	5	630
33	6	20	2,520
33	6	30	3,780
33	6	50	6,300
33	6	60	7,560
40	15	5	1,787
40	15	20	6,300
40	15	30	9,450
40	15	50	15,750
40	15	60	18,900
50	40	5	4,200
50	40	20	16,800
50	40	30	23,200
50	40	50	42,000
50	40	60	50,400

causes the material to feed down along the sheets to the openings. Proper centrifugal force and shaker speed will result in quicker unloading without damage to car or to track supporting structure.

At a large manufacturing plant one of the earliest models of a car shaker in the unloading of coal for use in the powerhouse, is used. The hopper car full of coal is spotted over a hopper which has a capacity of approximately 10 tons. The coal is dropped into the hopper and from there it feeds into a crusher. After the crushing operation, it is discharged into a bucket elevator. The coal is then discharged onto a conveyer which carries it to bunkers for use.

Before the car shaker was installed, 3 men were permanently assigned to empty the hopper cars, and during the winter months 2 additional men were assigned. Thus, 3 to 5 men, depending upon the conditions, were continuously working to keep enough coal flowing out of the hopper cars so that a sufficient amount of coal was continuously available at the bunkers. The time required to empty a 50 ton car averaged about 1¼ hr, with variations from that figure depending upon conditions. Using the average time, in summer it required 3¾ man hr and in the winter it required 6¼ man hr to empty one hopper car. Unloading by this method often necessitated the men climbing into the car and doing their pounding, digging and chopping on the material while they were standing on it. Needless to say, the accident rate on this job was the highest of all the power plant activities.

FIG. 3—An Allis-Chalmers car shaker used for removing fine limestone from hoppers. Conveyer system for transporting limestone into the plant is shown at the right.

Since the shaker was installed, Fig. 3, one man has been permanently assigned to emptying the hopper cars. During severe cold weather when freezing of the material takes place, a second man is assigned to handle the thawing operation.

The accident rate for the entire coal unloading process has been reduced to a point where an accident directly related to the coal unloading is practically eliminated. Average age of men who operate the car shaker is 60 years and they have built up an impressive safety record.

Conveying facilities limit shaker

The actual limitation on the car shaker at this installation is dictated by the capacity of the conveying facilities. The size of the receiving hopper, the capacity of the crusher, the bucket elevator and the conveyer do not allow an entire hopper car to be unloaded at one time. If it were not for the limitations imposed on the car shaker by the discharge facilities, a 50 ton car could be completely emptied in a matter of a few minutes when the material is not frozen.

Unloads 15 cars per hour

A car shaker will unload up to 15 cars of coal every hour, depending upon the capacity of the material handling system and switching facilities. In one installation, a series of cars are emptied, without moving the cars, by handling the car shaker with a mono rail hoist and moving the shaker from car to car. Each car contains different analyses and is spotted over the correct receiving hopper. Thus the products can be blended.

The principle of the car shaker is simple. It must produce a relative movement between the slope sheet of the car and the material within the car. Too low a speed of the car shaker will not produce the necessary movement and too high a speed will damage the hopper car. By operating the car shaker only long enough to cause the material to flow out of the car, additional savings can be made in operating and maintenance costs.

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Willys gets out of tight spot

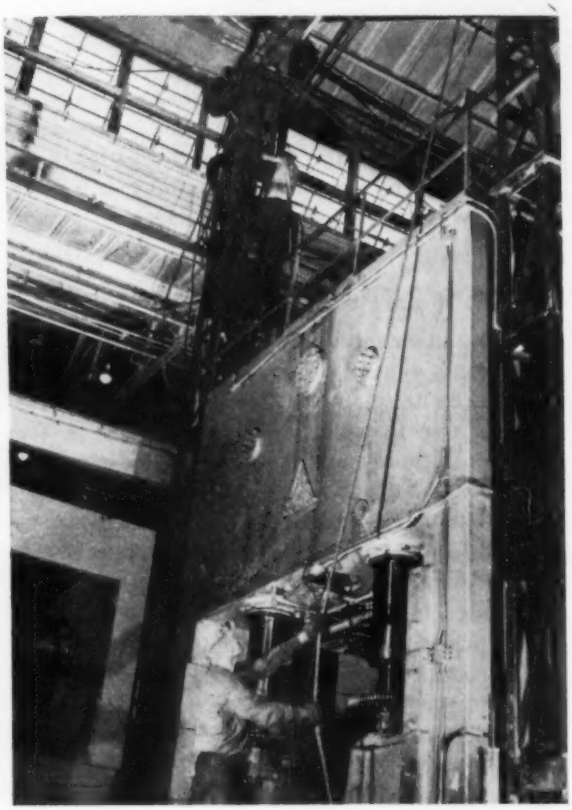
Fitting a 950 ton triple-action Clearing press into a press line can't be accomplished with a shoehorn. However, when only 400 sq ft of floor space is available to do the job and the press itself occupies 160 sq ft, this would be an ideal solution to the problem.

Several years after installing 27 Clearing presses, Willys-Overland Motors, Toledo, decided to add a 950 ton press. No provision had been made for the addition. After consulting with Willys-Overland engineers for several weeks, Commercial Contracting Corp., Detroit, was asked to undertake the job.

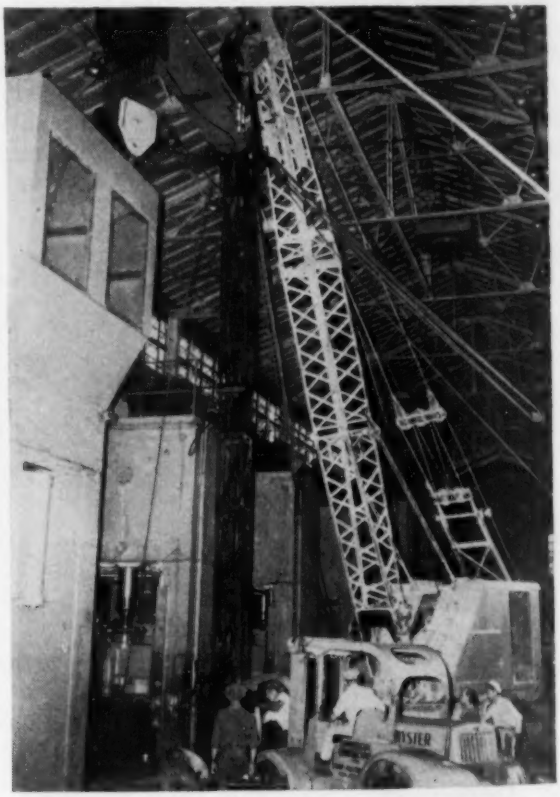
The crown of the press weighing 108 tons could not be handled by overhead crane facilities. The job had to be done by using two A-frames which straddled the existing neighboring presses. Conveyer lines had to be rerouted; catwalks and utility lines were moved. In addition, the job had to be accomplished without any loss of normal production.

Actual moving of the base and the crown of the new press was accomplished during two weekends.

A new large press is operating where it was never intended. Ingenuity has added appreciably to Willys-Overland's sheet metal stamping capacity.

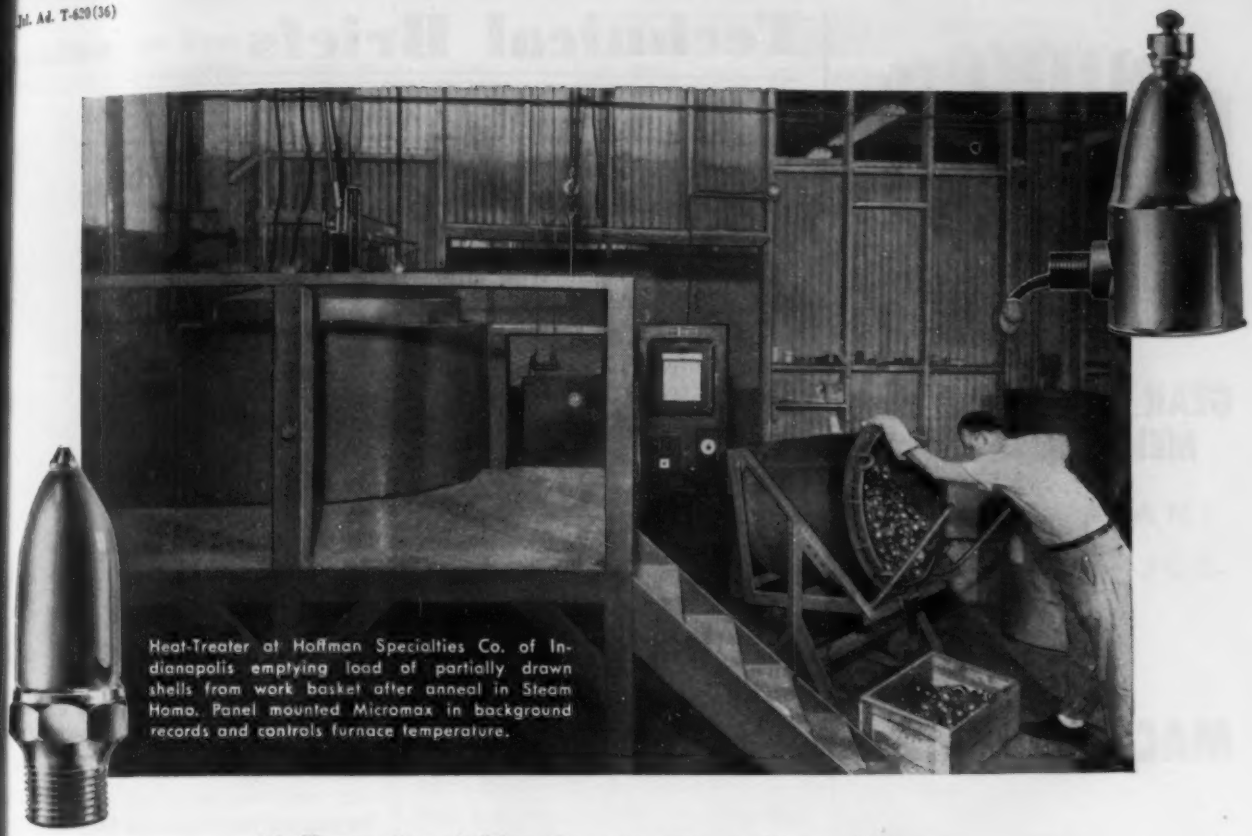


INSTALLING a 950-ton press in close quarters at Willys-Overland Stamping Plant required the use of two A-frames. The new equipment had to be inched into limited space in a line of 27 presses.



WORKMEN preparing to hoist the 108-ton crown of the new Clearing press. Close adjustment of cables was necessary to prevent damage to adjacent machinery.

Ind. Ad. T-620(36)



Heat-Treater at Hoffman Specialties Co. of Indianapolis emptying load of partially drawn shells from work basket after anneal in Steam Homo. Panel mounted Micromax in background records and controls furnace temperature.

Hoffman Specialties Co. reports on Steam Homo

"Increased Uniformity...Increased Quality of Brass Parts"

• Scale-free heat-treating of both non-ferrous and ferrous parts at temperatures to 1150 F is one of the big jobs that the versatile L&N Steam Homo is doing for industry. Brass and bronze parts, for example, are treated so effectively that they come out of the furnace not only uniform in quality, but really clean . . . many times ready for use "as is."

The experience of the Hoffman Specialties Co., manufacturers of heating system products, illustrates these points. They have noticed that Steam Homo does even more than increase the uniformity and quality of product components. There is also an increase in the life of the tools used on their products in operations following heat-treatment. This is attributed by Hoffman to two factors:

(1) Uniformity in hardness of treated parts.
(2) Better adherence of lubricants to treated parts.

Hoffman's experience is typical of many users. Wherever a steam atmosphere is indicated . . . for steam-treating high speed cutting tools . . . for safely and uniformly bluing iron and steel parts or for steam-treating powdered iron compacts after sintering L&N Steam Homo is being enthusiastically received and successfully applied.

Safe, compact Steam Homo equipment is ideal for installation directly in production lines. It can be placed on the floor (as above) or sunk in a pit. Check the advantages of this furnace with your nearest L&N representative or write 4956 Stenton Ave., Phila. 44, Pa.

CAREER OPPORTUNITIES AT L&N

Expansion program of this long-established firm has many features to attract outstanding recent graduates in engineering and science. Opportunities are in sales field engineering, product and application engineering, research, advertising, market development. Widely-respected policies assure recognition of progress. Address Personnel Manager for preliminary interview at nearest of 17 L&N offices.

For full information about Steam Homo, send for the NEW 12 page catalog, "L&N Steam Homo Method for Heat-Treating."

LEEDS NORTHRUP

Instruments automatic controls furnaces

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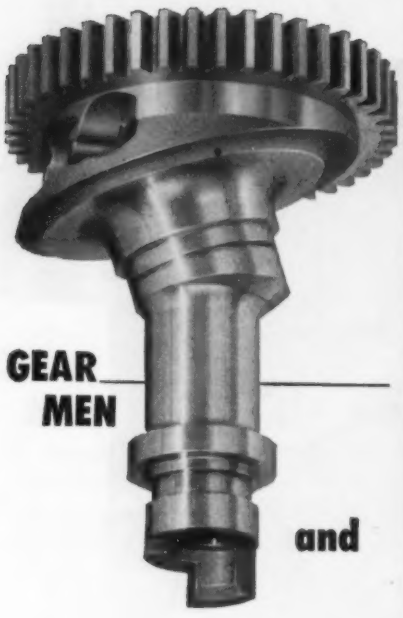

GEAR MEN and MACHINES

It is men . . . know-how . . . and the spirit to produce that delivers the gears when they are needed. It is the desire from top management down to deliver the goods, trouble-free and on time, that constitutes the big difference between manufacturers of gears.

Amgears has complete facilities to produce a full range of sizes from fine pitch instrument and aircraft gears to heavy gears for construction equipment, and includes facilities for manufacturing gear assemblies to your specifications. Our large capacity in effect provides a completely tooled, fully manned gear department for each customer.

Amgears manufactures spurs, sprockets, helicals, worms and worm gears, racks, straight or spiral miter and bevel gears—of both precision and commercial quality in any quantity.

Enclosed and open gear assemblies are an Amgears specialty. Many industrial concerns have found Amgears' experience in making complete gear assemblies both helpful and profitable.

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Technical Briefs

Engineering

ATOMIC BOILER WORKS:

Junior size atomic energy plant would fit in your garage.

California's first atomic energy plant was opened to the public when North American Aviation's water boiler neutron source was demonstrated at the company's Downey plant. The baby reactor is being used to further development of reactors and associated projects.

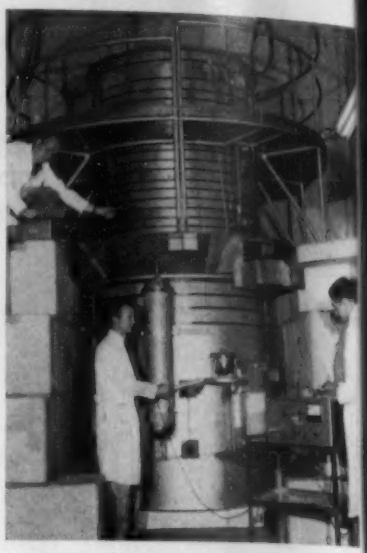
While small in comparison with reactors for producing fissionable materials it will give information of value in improving reactor design. The water boiler is part of a facility for making reactor physics measurements to enlarge basic atomic energy information. The water boiler neutron source will supply the neutrons, minute particles of matter, needed for measurements.

Low Power — While similar in construction and size to other low power water boiler reactors in the United States, the reactor's one watt power rating makes a cooling system unnecessary.

Exterior of the reactor is shielded by a housing of 2-ft thick concrete blocks each weighing 1000 lb, forming a structure about the size of a single car garage. The concrete surrounds a cylindrical graphite reflector 5 ft in diam and 6 ft high, formed by stacking graphite bars horizontally inside a steel tank. The reflector surrounds the reactor core, a stainless steel sphere one foot in diameter.

Uranyl Nitrate—Production of atomic energy takes place inside this sphere which contains a Uranium 235 enriched uranyl nitrate solution. It is from the nuclear fission of this material in a water solution that the reactor derives its power—and its name "water boiler."

Rate of fission, the production of atomic power, is controlled by a system of control rods which can be moved horizontally through the concrete and graphite to the core. These cadmium, boron, and aluminum rods have a retarding effect upon the nuclear fission inside the core.



CONCRETE BLOCKS used to shield baby water boiler atomic energy plant at North American Aviation have been removed to show unit. Reactor, used to further basic atomic energy research.

Two engineers are required to put the reactor into operation and bring it to the "full power" stage. Only one engineer is needed to keep the reactor in operation, while an additonal engineer conducts the test work.

Process Helps Fight Corrosion

High corrosion resistance for mild steel and other ferrous metals is reported possible with a recently developed thermo-chemical treatment for metals. Known as the Permyron process, the method has been approved by the Chemical Warfare Service of the U. S. Army for use in automotive, aircraft and other industries. Licensing rights to the process are held by Stanwood Oil Corp.

Produced on standard coating and heat treating equipment, the cost per sq ft or per piece is reported substantially the same as that of present methods or baking enamel finishes. Material costs however are lower.

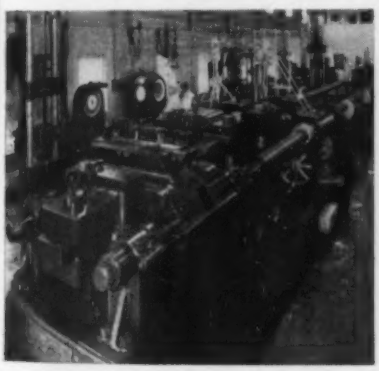
TESTING MACHINES:

Watertown Arsenal's 72-yr old test unit gets new life.

A 72-year old testing machine at the Watertown Arsenal, Watertown, Mass., is getting a new lease on life. The million pound capacity machine was the first to have both hydraulic loading and independent hydraulic load transmission to balance scales.

Four new Emery hydraulic load cells and a new Tate-Emery control system with three-range load indicator dial have been added. The electric motor-driven oil pump in the control cabinet replaced accumulator type hydraulic equipment occupying 200 sq ft of floor space.

Load Indicators — Operation of the old machine is now nearly identical with that of seven Baldwin testing machines of smaller capacity. Loads are automatically indicated on a large dial instead of being determined by slow, manually balanced lever system. Load changes are followed instantly under changing load conditions.



MILLION pound testing machine at Watertown Arsenal, Watertown, Mass., in service 72 years, has been modernized with modern Tate-Emery indicator and control cabinet.

Immediately following this test a horse hair 0.007 in. in dia was slowly strained and stretched 30 pct before breaking under a load of one pound indicated by the scale. As a check, subsequent tests on bits of the horse hair were also broken by dead weights of 1 lb.

Built in the 1870's by A. H. Emery, original contract price for the machine was $31,500.

Turn Page

ROLOCK

FABRICATED ALLOYS

AN ASSEMBLY THAT *"Gives a Lift"* TO AN IMPORTANT HEAT TREATING JOB

Four sets of these Stacking Furnace Baskets were custom-fabricated by Rolock to fit pit-type furnaces built by Hevi Duty Electric Company. Photo at left shows bottom grid, mesh disc, lift straps and fastening keys. Photo at right shows complete assembly ready for furnace.

They are used by a nationally known manufacturer for hardening at 1850° F. Material of basket is type 330 stainless steel. Size, each basket, 28″ I.D. x 12¾″ high. To facilitate handling in and out of the furnace the baskets are securely fastened together with alloy lift straps and keys. Note fabricated bottom grid and mesh disc. All welding is of the highest quality.

Rolock equipment is engineered to suit the specific job . . . for maximum strength . . . for as high a ratio of load to weight as safety permits . . . for handling convenience . . . and for low hour-cost through extended service life. Our engineering department likes to solve problems. Tell us about yours!

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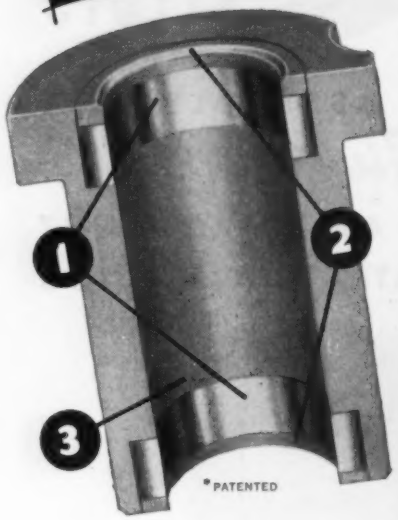

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DRILL JIG BUSHINGS

There are three simple reasons why MEYCO Carbide Inserted Bushings have won an enviable reputation for themselves:

1. Cemented tungsten carbide inserts at the points of wear increase the life of the bushings an unbelievably long time.

2. Hardened steel rings above and below the carbide inserts protect both drill and carbide from the shock of impact.

3. Body of hardened special alloy steel, combines the best features of steel bushings with the best features of carbide.

The story is simple: MEYCO bushings last as long as solid carbide bushings in most cases at costs that come close to the prices of ordinary steel bushings. And on top of that—they will increase the life of drills and fixtures, maintain accuracy much longer and solve extra tough production drilling problems. Made to A.S.A. Standards. For full information write for catalog No. 31.

Manufacturers of precision tools since 1888

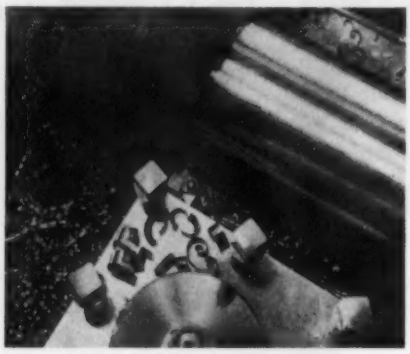
W. F. MEYERS CO., INC.
BEDFORD, INDIANA

FASTER TURNING:

Production of gun tubes speeded with clamped carbide tool.

Doubled production of 105 mm gun tubes at a midwestern ordnance plant was recently achieved by replacing conventional brazed carbide tools with standard, cemented tungsten carbide clamped tools.

By minimizing tool changing down time and eliminating one roughing cut, production time per tube was slashed from 3.6 hours to 1.8 hours—a 50 per cent reduction.



TIME PER PIECE has been cut from 3.6 to 1.8 hr in turning 105 mm gun tubes using Kennametal clamped tool. Brazed tools were previously used.

Odd Sizes—Original tools used on this job consisted of a variety of carbide grades and shank sizes which were on hand when the gun contract was obtained. To turn these tough chrome-nickel forgings (Brinell 350-385) at 75 rpm and a 0.023-in. feed required two roughing cuts, a semi-finishing cut and a finishing cut—a total of four operations on a LeBlond tracer lathe.

Grow Hair on Aluminum "Head"

Scientists at General Electric have used a sheet of pure aluminum cut in the shape of a man's head to demonstrate poor resistance of aluminum under some conditions. Normally formation of aluminum oxide on aluminum surface in air, prevents further corrosion. Scratched under mercury however, the oxide film formed continues to sprout into a hairlike growth.

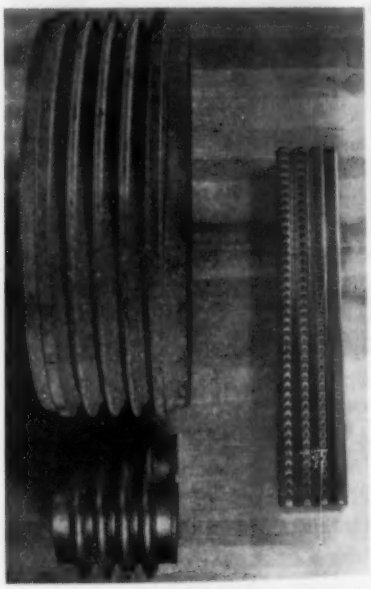
CRUSH GRINDING:

Technique permits quantity manufacture of broaches.

Military and peacetime product designers are continually specifying more and more intricate shapes that can economically be produced only by the broaching process.

Small Wheels—A 0.003-in. radius can be easily produced on a grinding wheel by crushing techniques as developed by Colonial Broach Co., Detroit. Many intricate shapes require small diameter grinding wheels to back off broach cutting surfaces. A wheel as small as ⅜-in. diam can be formed by crushing methods to meet this need.

Surface broaches produced by crush grinding methods are smooth and have an excellent finish. The grinding wheel abrasive surface as crushed is sharp and hard, which explains why smooth high finish surfaces are produced. Smooth surfaces on broaches improve performance and increase tool life.



CRUSHING ROLL and grinding wheel for producing segment for a surface broach, right, that produces 11 teeth at a time on a 294-tooth, 4-pitch, 6-ft diam tank turret internal ring.

Three Steps—Three main steps are required to produce a given wheel shape. First a precision

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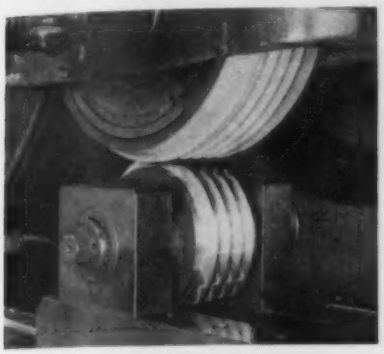
hardened master is produced. Next a high strength cast iron crushing roll is machined with the master form tool. Special equipment and techniques assure absolute duplication of the tool form in the iron master.

Finally the wheel is formed in position on the spindle of the sur-



ACCURACY of 0.0002-in. all over is the usual rather than the unusual for shapes. Crushing operation above shows crushing roll against grinding wheel.

face grinder by the crushing roll. The wheel is recrushed when necessary to maintain tolerance specifications.

Where It Pays—Crushing roll is remachined when necessary. In general if 6 inserts or duplicate surfaces are required for a production setup, the expense of making a form tool and utilizing crush grinding techniques is justified. In many cases complicated surfaces will warrant crush grinding in smaller quantities.

Shapes have been produced in surface broaches by crush grinding. Accuracy of 0.0002-in. all over is the usual rather than the unusual for shapes even as intricate as those shown in the illustration.

Let her know how much stupid earns before we have another office collection.

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● **Corrosion resistant**
● **Extra strength** ● **Uniform temper**

Keystone's Galvanized MB Wire offers improved corrosion resistance . . . gives added life and strength to mechanical springs subject to rust and corrosive conditions. This is due to Keystone's unique method of galvanizing the wire before it is cold-drawn. The drawing process smooths and hardens the galvanized finish, improving its lasting qualities. This smooth finish, corrosion resistant spring wire is also furnished in Type 2 and Type 3 heavy weight zinc coatings before drawing to meet specified salt-spray tests.

INDUSTRIAL WIRE SPECIALISTS

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Many Costly Fires Like This Are PREVENTED by "AKBAR"—

The KINNEAR Steel Rolling Fire Door

40% of the *biggest* fires in a single year showed lack of fire-door protection as contributing to the heavy losses.*

You get *positive, automatic, dependable* fire protection at doorways and windows with *Akbar* Fire Doors. They're *pushed* downward by a strong spring . . . *controlled* in downward speed . . . and operable *after* closure, for emergency use.

These efficient doors remain coiled out of the way, overhead, when not in use, but lower *automatically,* with speed, efficiency and *safety,* when fire threatens. They combat fire loss by cutting off drafts, blocking flames, and confining fire to small areas.

Approved and labeled by Underwriters' Laboratories, they have saved as much as 33% of their cost *annually,* in reduced insurance rates. Built to fit windows, doorways or other openings of any size.

"Akbar" Doors can also be equipped for daily service use, with or without motor operation. But standard (non-labeled) Kinnear Rolling Doors are preferred for service use where extra fire protection is not needed.

The KINNEAR Manufacturing Co.

FACTORIES:

1760-80 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.

Offices and Agents in All Principal Cities

*(As reported in the Jan. 1947 Quarterly of the National Fire Protection Association.)

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

—Technical Briefs—

EXPOSITION:

AISE plans bigger, better Cleveland meeting Sept. 30-Oct. 3.

Some 10,000 steel and metalworking executives, with a larger percentage of foreign visitors than ever before, are expected to attend the 1952 Iron and Steel Exposition at Cleveland Public Auditorium Sept. 30 through Oct. 3, I. N. Tull, AISE president reports.

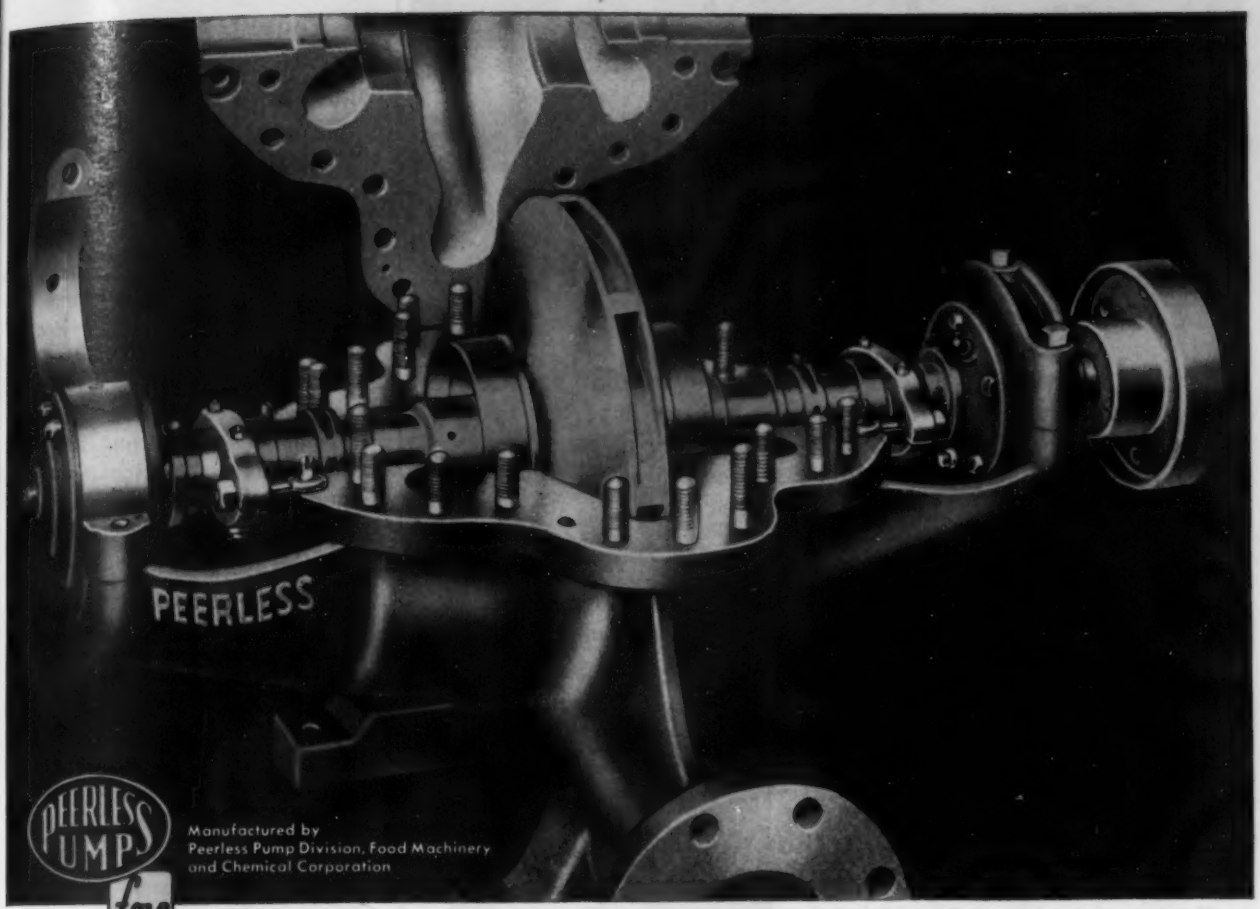
Thirty-nine technical papers dealing with specific problems of steel plant production, engineering and maintenance will be presented in 13 separate sessions. Sessions are classified as: combustion, electrical, mechanical, rolling mill, lubrication, blast furnace, and operating practice.

Sejournet Process — Jacques Sejournet of France is scheduled to present a discussion of the Sejournet process of extruding steel which uses glass as a lubricant. Mr. Sejournet's discussion will be presented at the Operating Practice Session, Thursday morning, Oct. 2.

Working models of a blooming mill, a continuous billet and slab mill, and a cutaway and working model of a gas conversion furnace will be shown. More than 200 manufacturers have reserved booth space for display of their products.

ALLIGATOR jaw attachment has speeded up riveting of light metals and small parts at Temco Aircraft Corp., Dallas, Tex. Attachment squeezes rivets in hard to reach areas of trim tabs. Unit replaces gun and bucking bar previously used which often caused buckling of thin skin. Jaws are pivoted and attachment fits in plunger and anvil holes of riveter yoke.

Turn to Page 174



When fire strikes IT PUMPS PROTECTION

This is the heart of reliable systems that protect against hazards of fire

America's annual loss to the ravages of fire is a staggering amount. Reliable plant and property protection often begins with an independent fire protection system, the heart of which is an approved and reliable fire pump. In the manufacture of fire pumps, rigid construction requirements and operational dependability are paramount. This is why National Bearing Division was selected to supply bronze impellers, wearing rings, and shaft sleeves, for this fire pump and other pumps bearing the Peerless name.

In supplying component fire pump parts to Peerless, a supplier must not only meet the rigid requirements of this manufacturer, but also the strict regulations of Underwriters' Laboratories, Inc.; National Board of Fire Underwriters, Chicago; and the Inspection Department, Associated Factory Mutual Fire Insurance Companies, Boston.

National Bearing's proved ability to mass produce exceptionally fine-grained, non-ferrous castings, free from blow holes and sand inclusions, combined with Peerless Pump Division's exacting engineering and manufacturing standards help build fire pumps, and industrial pumps that can be counted to pump a reliable water supply for fire protection or other plant needs.

If your product requires non-ferrous castings or bearings, National Bearing Division has the foundry facilities, experience and skill that will insure better product performance and may possibly lower product costs.

AMERICAN **Brake Shoe** COMPANY

NATIONAL BEARING DIVISION

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How long since you tested the gloves your workers wear?

The now widespread practice in industry of test-rating work gloves for specific plant operations has had two important results. (1) Management has been able to improve safety conditions, job efficiency and worker attitudes while, at the same time, greatly reducing glove costs to their companies or employees; (2) Modern types of coated and impregnated fabric gloves have replaced millions of pairs of canvas, leather and unlined rubber gloves on applications involving sharp edged, abrasive or slippery materials or the presence of grease, chemicals or thermal extremes.

These are typical examples:

Handling thin strips of stainless steel. Canvas gloves tested 28 hours. Gloves with reinforced neoprene (NEOX) coating tested 228 hours—a 76% cost saving.

Handling plate glass. A 6 months' test showed hand injuries reduced 78% by gloves with cut-resisting, non-slipping rubber-coated palm.

Dip-plating wire products. High injury rate and workers' dissatisfaction ended by replacing easily-snagged unlined rubber gloves with reinforced acid-proof gloves which eliminated hazard.

Handling rough logs and sawing and stacking lumber. Canvas and double-palm gloves tested 2 days; recommended plastic-coated gloves gave 30 days' wear and eliminated injuries from splinters.

Protecting broach rotor core operator from wet broach and rotor coolant carrying sharp slivers. Glove with extra duty reinforced neoprene (NEOX) coating resisted cutting and puncturing action, wore 5 times longer than best gloves previously tested.

Free Offer: Make Your Own Job-Test. Send us a brief description (on business letterhead) of your operation, materials handled, and temperature condition. Without charge we will make recommendation and supply sample gloves and procedure for on-the-job testing. Address Safety Engineering Service, Edmont Mfg. Co., 1234 Walnut St., Coshocton, Ohio.

Edmont job-fitted work gloves

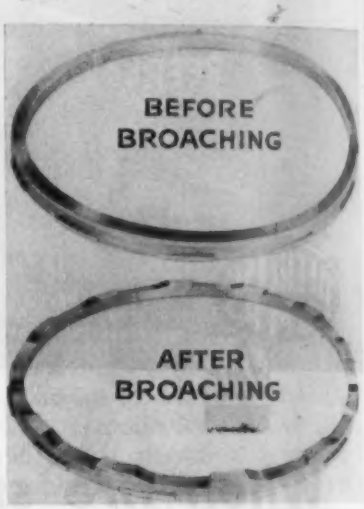
NEOX (reinforced neoprene) • Natural Rubber • Plastic

by the world's largest maker of coated industrial gloves

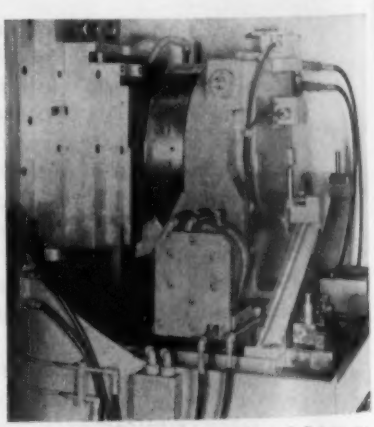
BROACHING:

Blind slots on ring broached easily with novel setup.

A standard broaching machine can be used for finishing surfaces where the broach cannot pass by the work in an ingenious broaching set-up developed by Colonial Broach Co., Detroit, Mich. The 6-ton, 42-in. stroke single ram vertical broaching machine produces 12 slots of identical shape on right- and left-hand 20-in. diameter stationary brake-applying cams for army tanks.



TANK BRAKE applying rings before and after broaching of blind slots which do not permit broach to pass by opposite side of part.



CLOSEUP VIEW of broach and fixture on 6-ton Colonial single rambroaching set up to cut blind slots in tank brake cam rings. Fixture holding rings is mounted on receding table.

Blind—Slots, not diametrically opposite each other, are blind and do not permit passing a broach completely by the part. The broach only

travels 17 in. to produce each slot and returns to the top of the stroke in position to finish another slot. It does not touch the opposite side of the ring.

In operation, the ring-shaped cam is loaded on an index fixture mounted on the receding table of the single ram machine. The fixture is then trunnioned to a vertical position by a hydraulic cylinder.

Next the table shuttles into position and one of the slots in the part is broached. The table then recedes and the part is indexed on the hydraulically controlled fixture, and the table shuttles into position for cutting another slot. Indexing and shuttle action are automatically controlled.

TEST BUILDING:

Douglas builds unusual building for destructive test equipment.

Cathedral-like, 140 ft long and 140 ft across the transepts, the largest aircraft static test structure in the West is rising at the Douglas Aircraft Co., Long Beach Div.

The $150,000 structure with its $50,000 worth of hydraulic jacks and electronic gages will be able to tear a C-124 to pieces in what engineers call destructive testing.

Rigid—With girders 4-ft long and 2-ft wide, the static test machine can maintain the severest rigidity while sensitive instruments register the yield of a member under stress.

Foundation of the static test machine is 10 ft deep and its concrete, with embedded steel reinforcing, weighs 3000 tons. Forty concrete piles extend 20 ft underground and can resist a force of 50,000 lb.

Steel Track—A steel track will be mounted on the foundation with 4500 drilled holes for the attachment by steel bolts of various hydraulic jacks and other testing equipment. These jacks can exert a force of from 10,000 to 100,000 lb in any direction. Some are powered with electric motors, some are small enough to be operated by hand.

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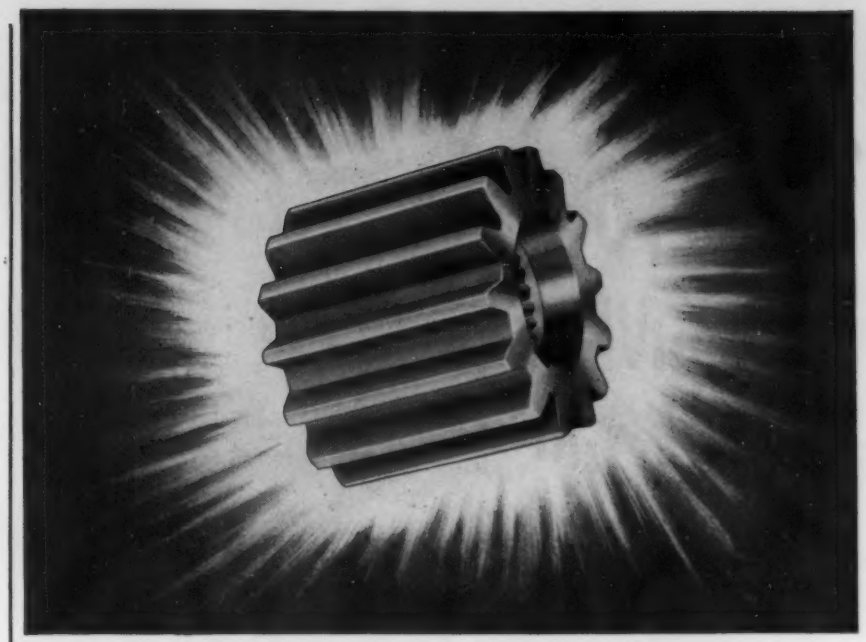

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—Technical Briefs—

CORE BOXES:

Simplified system cuts need for special boxes at NBS foundry.

A simplified system of cylindrical core boxes has recently been devised by Richard H. Harwell and J. H. Schaum of the National Bureau of Standards. A set of 14 boxes for cores ranging in diameter from ⅜ in. to 2 in. in ⅛-in. steps, has been made for the NBS experimental foundry.

With one box for each diameter core, the length of each box has been fixed at the maximum likely to be required for a core of that diameter as shown by experience. Shorter cores can be cut from full-length units, or made by placing round wood plugs of proper length in the core-box cavity. A brass insert of standard taper is used to produce a tapered end core.

Core Mix—Core boxes are filled and rammed with conventional sand-and-binder mixtures. A typical mixture contains washed silica sand, about 1½ pct linseed oil, ½ pct corn flour, and 3½ pct moisture. After the sand has been formed in the core box, it is removed and baked for an hour or more at about 400°F.

SIMPLIFIED CORE BOX system in use at experimental foundry of the National Bureau of Standards has made production of many sizes of cores easier, faster.

Boxes were made of wood at NBS, but metal might prove more satisfactory in production work. Brass was used for the tapered inserts. Each insert is 1/32 in. smaller in diameter than the core box with which it is used, to facilitate placing it at the bottom of the box prior to ramming the sand.

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Tapers Standardized — Tapers were standardized at 15° instead of the wide variety of tapers encountered in common practice. A standard vertical length for the tapered insert was also adopted for each core diameter.

Because taper and length of core ends are standardized, it becomes possible to use a master set of core prints, which further simplifies foundry operation.

CYLINDER CLOSING:

Propane, oxygen combination cuts cylinder forming costs.

A 30 pct saving in the production cost of forming and closing fire extinguisher cylinder ends resulted from the substitution of oxy-propane for oxy-acetylene at the Belleville, N. J., plant of Walter Kidde & Co., Inc.

COSTS TUMBLED 30 pct with introduction of propane and oxygen combination for forming and closing of fire extinguisher cylinder ends at Belleville, N. J., plant of Walter Kidde & Co., Inc.

Cylinder ends are heated in induction coils to 2000°F. The cylinder is then placed on a vertical spindle and revolved. A heating head, utilizing a fuel gas burned with oxygen, maintains the temperature while the semi-automatic machine forms and closes the cylinders.

Turn Page

The new Slotted-Type

"Place Bolt

as made by "CLEVELAND"

(Licensed under U. S. Patent No. 2543705)

● Economical in cost and use, Place Bolts have broad application possibilities in tough vibration point assembly jobs. The new design with slotted head is cold forged out of carbon as well as alloy steels—a lower cost one-piece self-locking fastener having increased yield and fatigue strength.

This is the screw that locks itself by the diaphragm spring action of its head when tightened against a rigid seat—locks against all involuntary loosening influences including vibration, and insures against impact of shock failure. If you're not acquainted with this unique fastener, write for folder on "Cleveland" Place Bolts, and prices.

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DRILLING:

Fifteen men work together at big Lockheed drilling tool.

A two-story-tall drilling tool used for precision spotting of holes is helping turn out magnesium floor sections for new Lockheed Super Constellation transports for the U. S. Navy at a faster rate than ever before.

Designed and built at Lockheed Aircraft Corp., Burbank, Calif., the huge jig measures 35 ft, 5 in. long and 17 ft, 9 in. high. The drill jig weighs 30,000 lb. Combined weight of the floor plates it fabricates is 1800 lb.

Movable Drill Plates — The multi-part, two-sided jig is so big 15 men can work on each side to drill the vast number of holes required to bolt the floor together and attach cargo tie-down fittings. Holes are drilled—right where they belong—through 10 movable drill plates, 5 on each side of the structure.

Weighing 1000 lb each, the plates are lowered into position or raised vertically to their storage rack by electric motors. Safety switches permit only a single panel on each side of the jig to move at one time.

Sloped Sides — Sloped-angle construction of the working surfaces of the jig keep unsecured planks from falling to the floor.

Width of the Navy ship cargo floor is made up of 22 T-shaped extruded magnesium planks, each 5 in. wide. These planks interlock to form a self-strengthened bed. Varying section lengths are bolted together to form the continuous 73-foot-long planks of the cargo floor.

CREW LOWERS 1000-lb drill plate into position on big Lockheed drilling machine. The 30,000-lb jig was built for mating high-strength magnesium flooring for new Navy Super Constellation.

Alignment — One edge of the center-joining planks is drilled on each side of the jig to assure proper alignment with mating planks and compensate for metal expansion in varying temperatures.

The magnesium floor, built to hold a load of 300 lb per sq ft, weighs 70 lb less than a similar wooden structure.

Dreamed up by Lockheed engineers faced with the problem of handling increasingly larger assemblies with the precision usually associated with smaller units, the drilling tool has saved time, improved production.

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Wanted A HARD JOB

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FURNACE BRICK:

Timken saves time, money using shaped brick in furnace roofs.

Time, money and health have been saved in a new system of building electric furnace silica brick roofs. Until several years ago, Timken Roller Bearing Co. built electric furnace roofs from standard fire brick. One roof required eight bricklayers about 5 days to complete. Each silica brick was shaped and layed into position.

Since 1948 pre-shaped silica fire brick, factory moulded, to Timken specifications have been used. Delivery of silica brick takes about 6 months. Materials for 25 roofs are ordered at a time.

Dust Eliminated—Results are impressive. What formerly required eight bricklayers, 5 days to complete can now be done by six

FACTORY SHAPED silica brick for electric furnace roofs have helped Timken Roller Bearing Co. cut rebuilding labor costs 70 pct.

bricklayers working 1 day. Silica dust has been eliminated. Labor costs on furnace roof building has been reduced by 70 pct.

Six electric furnaces require constant attention and care on the part of the bricklayers. Electric furnace roofs undergo extremely high temperatures ranging from 3000° to 3100°F. Life expectancy of a silica brick furnace roof is 3 to 4 weeks.

Improved Morale—In addition to the savings in labor costs, reduction of dust which went with the brick by brick method has set the stage for elimination of a health problem. It has made for better working conditions and improved morale.

TECHNICAL TOPICS

12-14% CHROME TYPE ALLOY

Norman S. Mott
Chief Chemist and Metallurgist

This composition is a mildly corrosion-resistant alloy capable of being heat treated for a variety of properties including high strength and hardness. It has a low coefficient of expansion, is tough, machinable, weldable, and finds extensive use in valve bodies, valve trim, pump parts, grinding units, etc., especially in power plants, oil refineries, and paper mills. The alloy has suitable corrosion resistance for applications involving superheated steam, hot oil, foodstuffs, and some neutral salts; however, it will rust to a slight extent in a moist atmosphere. Its low cost, strength, hardness and wear resistance, plus great corrosion resistance, make it an ideal alloy for specific applications where these factors are of primary importance.

This alloy is supplied in three carbon ranges: under 0.15%C, 0.15 to 0.25%C, and 0.25 to 0.35%C, these being designated as CA 14S, CA 14I and CA 14 H respectively. The carbon range selected depends upon the final degree of hardness desired as well as other properties. Increasing carbon up to 0.25% increases hardness appreciably in the quenched, and quenched and drawn below 900°F. condition. Above 0.25% the increase in hardness is slight and these higher carbon contents, unless the slightly greater hardness is essential as in wear applications, are not recommended, as ductility and shock resistance are seriously lowered.

In the quench hardened condition this alloy has its best corrosion resistance. Drawing the quench hardened material at 600°F. increases the ductility and shock resistance without decreasing the hardness to any appreciable extent, and without any effect on the corrosion resistance. It also is very effective in eliminating hardening stresses and the danger of cracking.

The best hardness range for machinability is 220-240 BHN. This range is best obtained by tempering at 1200°F. for under 0.15%C, at 1300°F. for 0.15 to 0.25%C, and at 1400°F. for 0.25 to 0.35%C. Softening to too low a hardness causes gumming and poor machinability, also it causes low maximum hardness upon rehardening.

Molybdenum in amounts of 0.4 to 0.6% is sometimes added to improve machinability and high temperature creep resistance. Copper is often added to the extent of 1.0% to improve corrosion resistance and is occasionally combined with molybdenum additions. Nickel in amounts of over 0.75% and silicon over 1.0% are to be avoided. Nickel greatly increases the hardness in the tempering ranges used for machinability and necessitates lengthy special heat treatments. Silicon has a very detrimental effect on impact resistance when the alloy is drawn at 600°F.

Heat treatment for all carbon ranges of this alloy consists of oil quenching or air cooling from 1800°F. after slowly heating to temperature and holding for one hour, followed by tempering for 3 to 4 hours at the correct temperature necessary to obtain the desired properties. Avoid tempering temperatures of from 900-1100°F. as this range produces low corrosion resistance and mechanical properties. Oil quenching from the hardening temperature produces slightly higher hardness values than air cooling, but is not practical for large castings. A hardening temperature of 1900°F. will produce slightly higher hardness values upon quenching in the 0.25 to 0.35%C grade.

Copies of this article available on request.

The **COOPER ALLOY** Foundry Co., Hillside, N. J.

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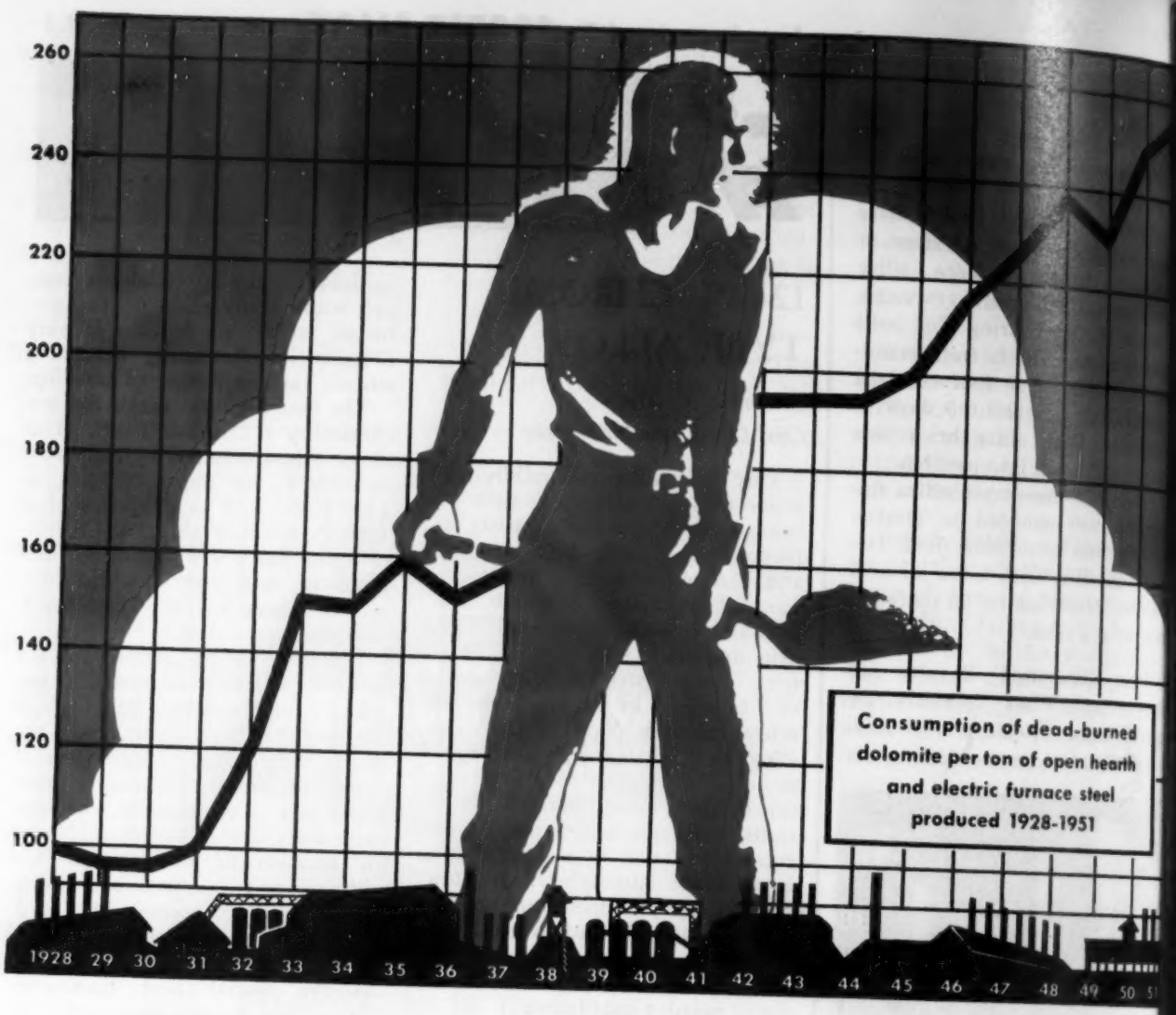

why the swing to dead-burned dolomite?

THE use of dead-burned dolomite by the steel industry has more than doubled in the past 24 years. Consumption per ton of steel is now a third higher than during the war. This steadily rising trend is due to three factors:

1. It saves time. Operation of steel furnaces at near capacity rates demands a repair material that "sets fast and stays fast". Normal maintenance with dead-burned dolomite takes no more time than is required to place the refractory.

2. It reduces bottom delays. The deteriorating quality of charge materials, fluxes and fuels contributes to increased severity of bank and bottom trouble. Proper use of dead-burned dolomite makes it possible to offset the adverse effects of these factors and keep bottom delay down.

3. It lowers refractory costs. Despite the continuing trend toward the use of more dead-burned dolomite, many shops report a reduction in total maintenance refractory expenditures, with consequently lower refractory cost per ton of steel made.

Dead-burned dolomite is now in free supply. Steel producers who have been dependent on other fettling materials can now take advantage of the economies of a dead-burned dolomite practice. Present users, too, may benefit from a more liberal use of this low-cost refractory.

With the completion of its third major dead-burned dolomite expansion in the last ten years, Basic Refractories is prepared adequately to serve the needs of the steel industry with Magnefer and Syndolag.

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Steel Supply, Demand May Balance in Early '53

Most steel men, planners interviewed by Iron Age say steel will ease late in first quarter of '53 . . . Clearer sailing from second on . . . What happened to manufacturers' inventory.

The shortage-stung steel consumer may have to brawl for his metal for the rest of this year but he will probably see supply swing into a reasonably satisfactory balance with demand by the end of the first quarter of 1953. And from the second quarter on, the nation's fast-sprouting steel production capacity will act as formidable interference in pushing shortages aside.

This is the expert opinion of most of the steel executives and government planners interviewed by THE IRON AGE this week in an attempt to slip a backbone into the many wild-flying predictions as to when the steel shortage will ease.

A minority of steel men felt that supply would not balance with demand until the second quarter. But their pessimism was founded principally on the question of whether steel buyers would seek to rebuild inventories to high prestrike levels or be content with less.

The Defense Take—Military demand was another uncertainty mentioned by all. And at latest reports military demand for steel is expected to ease from its present level but to be fairly strong throughout the first quarter. Yet no sensational increase in requirements is foreseen.

Steel producers now feel that government controls on their production will not be justified after the first quarter in view of the easing market. Few in the industry doubt that mills, besieged by rush orders today, will be looking for customers on most of their products by the end of the second quarter. Some will have to be sold during the first quarter.

Steel availability will not ease for all steel products late in the first quarter or early in the second. Demand pressure for large diameter bars and tubular goods from oil field operators and defense plants will continue strong. But wire products demand is already showing signs of softening and small bars and flat-rolled items should be watched for signs of weakening.

Inventories Slide — Unusually high inventories before the strike were dropped from an estimated 18 million tons to about 8 million tons when the strike ended (exclusive of warehouse stocks). This 18 million tons of steel items stacked in manufacturers' plants tells the tale of why metalworkers did not rush into the market in the initial phase of the strike. Experts say that a comfortabe inventory today should be 14 million tons.

During the rest of 1952 only 2 million tons will go into inventory, industry sources believe. This is contrary to more glowing government estimates running as high as 4 million tons. The industry believes that 14 million tons ("normal" inventory) may be in manufacturing industry's hands at the end of the first half.

Ingot Rate Dip?—Behind this massive production push to offset grievous strike losses of steel is the industry's huger capacity. It now tops 112 million ingot tons—as compared with 108.5 million tons last Jan. 1.

According to some experts queried by THE IRON AGE, mills should be producing at the annual rate of 86 million tons of finished steel in the first quarter of 1953. They estimate first quarter civilian and defense demand, not including additions to inventory, as running at the yearly rate of about 80 million tons. About 1.5 million tons would be available to replenish inventory.

Automobile producers are having a field day of optimism over future steel supply. Many of them believe that the shortage will evaporate by the early weeks of 1953 and that supply will ease steadily this year. Steel producers, regarding large defense set-asides (especially in bars and plates), can't see eye-to-eye with Detroit.

Some of this automaking optimism may be based on the belief that steel will pile up for defense needs and force cutbacks in military ordering.

Unfinished Order — From some quarters of manufacturing industry resentment was focused on Office of Price Stabilization's half-a-loaf order permitting pass-through of higher costs for steel, aluminum, copper. The OPS order made no provision for higher costs in wages and transportation—factors of substantial importance when a manufacturer reckons his production costs.

OPS now has "under consideration" almost 4000 applications for the right to pass along higher costs of labor, freight, and other materials. And there is evidence that desperation of some industries may force OPS to give this matter more than mere "consideration." Many industrialists still hold out hope that relief of this kind may come within a few weeks. Machine tool builders already were bitter over cost inequities.

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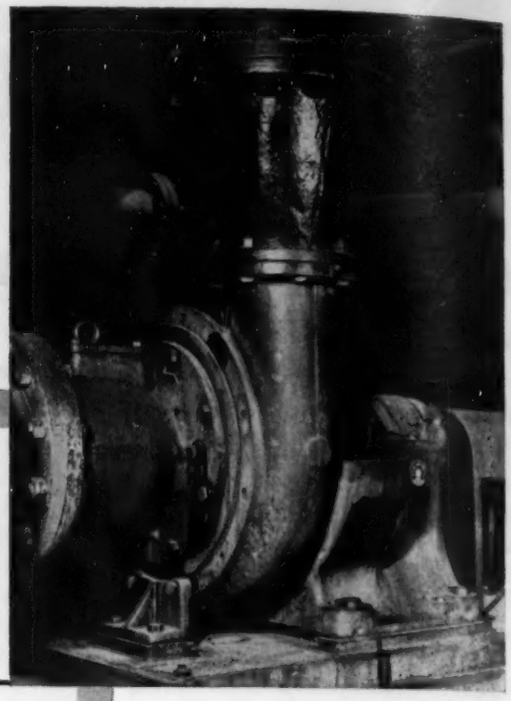
Free-Machining ENDURO gives you—



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REPUBLIC STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

Market Briefs

More Capacity—In Chicago, Inland Steel Co. reports the first of its four new open hearths will be in production by Sept. 15. The remaining three will come in at intervals between Sept. and January. The new furnaces will increase Inland's capacity from 3.75 million to 4.5 million tons. When these furnaces are in operation, Inland will no doubt retrieve the blast furnace loaned to U. S. Steel last week. In this deal, Inland's No. 2 blast furnace, which has been idle for some months, is producing pig iron for U. S. Steel's Gary Works. Inland is also placing 10,000 tons of basic iron on the market before Sept. 30. Most of this will be used to make steel which will no doubt find its way into the conversion market.

Gray Fadeout—Sources familiar with the gray market indicate it will probably fold up completely in about 3 to 4 months. The signs are already there—business is small in volume and buyers are extremely cautious. Price trends can be illustrated with cold-rolled sheets: 9.75¢ per lb just before the strike settlement, 7.50¢ to 7.75¢ a week ago. Latter price is just over the new warehouse list.

New DO Symbols—Defense Production Authority has added two new symbols to its list of allotment and DO numbers. B-7 covers certain stockpile requisitions by the Defense Dept. and C-6 concerns direct defense needs for friendly foreign nations.

Freight Rate Relief—Office of Price Stabilization is weighing a request from used steel drum industry for aid in efforts to change the recent freight classification requirement affecting rail shipment of used empty drums. Industry representatives maintain Interstate Commerce Commission requirement will raise shipping costs 25¢ to 50¢ per drum. This increase is in addition to the ICC approved general rise of 15 pct in freight rates.

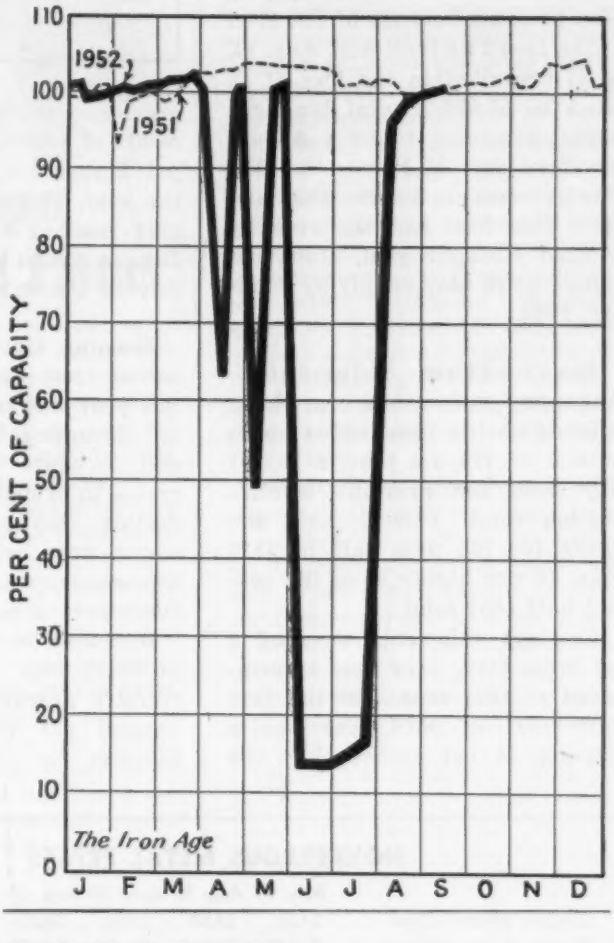
MSA Orders—Britain has placed new Mutual Security orders for $24 million worth of iron and steel products with U. S. and Canadian mills. MSA approved purchase of $15 million worth of iron and steel mill materials and steel mill products in the U. S. and $9 million worth of ingots, ferro-alloys, pig iron and ferrous scrap in Canada.

Cracking Unit—Standard Oil Co. of California plans to build a new catalytic cracking unit at its El Segundo, Calif. refinery. The $20 million unit will be used to convert heavy oil into aviation and automotive fuel. Capacity will be 36,000 bbl daily. Construction is scheduled to begin in mid-1953.

Need Steel—Small-arms shutdowns or layoffs may have to take place, small-arms manufacturers are telling National Production Authority, unless there is a quick move to put more special steel into their industry's hands. Primary operations have dropped by 20 to 25 pct as a result of the steel strike. Impact is expected to become increasingly severe. One firm says its weapons assembly line may be forced to stop producing in about 3 months. Lack of only 4 tons of carbon side-plate steel will cause another to lay off 600 or 700 employees soon.

Power Project—A $22 million hydroelectric power development project is planned for Manitoba. The Provincial Hydro Electric Board, Winnipeg, has called for tenders for erection of the plant at McArthur Falls. Construction work on the dam is expected to start this month.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Aug. 24	99.0	101.0	102.0	100.0	105.0	104.5	103.0	104.5	96.0	103.0	89.0	90.0	119.0	99.5
Aug. 31	101.0	101.0	103.0	100.0	104.0	104.5	99.0	104.0	95.0	101.0	90.5	90.0	103.5	100.5

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.

Aluminum, Copper on Easier List

DPA now puts copper, aluminum, magnesium in Group II . . . Fowler estimates aluminum lost by steel strike at 55,000 tons . . . Alcoa now after auto trim market—By R. L. Hatschek.

Defense Production Administration's revised list of materials and their relative supply positions shows aluminum, copper and magnesium shifted from category I (short supply) to category II (materials in approximate balance with defense and essential civilian demand). Shift is the first showing both copper and aluminum in the easier group.

Delays in the aluminum expansion program because of the steel strike (see THE IRON AGE, Aug. 14, p. 81) resulted in the loss of as much as 55,000 tons of the light metal, according to DPA Administrator Henry H. Fowler. But Mr. Fowler went on to say that, despite this loss and the recently boosted stockpile goal, aluminum should be in easy supply by January, 1954.

Magnesium Shipments—Wrought magnesium products shipped during June added up to a total of 714 net tons, a 19 pct dip from the previous month's 881-ton total. This brought the figure for the first half to 5118 tons, 10 pct higher than the second half 1951 total.

Castings shipments were off 2 pct from May, 1474 tons as compared to 1501 tons. But the first half total of 9628 tons was a rousing 44 pct higher than the previous 6-month total. And shipments of primary metal scored 77 pct higher for the first half of the year. Shipments in this category reached 25,338 tons through June as compared to 14,348 for the July to December period in 1951.

Zooming Output—The 6-month period from January to June of this year was the first full period of Government plant operation and accounts for the huge increase in primary magnesium production (see p. 90). These six plants were being brought up to near-capacity output during the latter part of last year.

Increases in wrought and cast products was due primarily to military procurement, though increased use of magnesium die castings for civilian goods also contributed. The slackening during June resulted from the steel strike and general low level of industrial activity for the month.

Tin Market—The Far Eastern price for tin declined several times last week and wound up at about the c.i.f. New York equivalent of $1.21. This enabled U. S. importers to resume activities at just under the Reconstruction Finance Corp. price of $1.21½ per lb. Toward the end of the week trading in New York was described as quite active, just the opposite of London and Singapore.

New Alloy—Aluminum Co. of America is making a bid for the automotive trim field. The company has just announced a new alloy, C57S, which it feels is a natural for this market. It is described as taking a brilliant Alumilite finish, either clear or colored, approaching high-purity aluminum in quality. Alcoa claims higher mechanical properties than pure aluminum and says that the newly-announced alloy has excellent forming characteristics.

The alloy has already been used for giftware and refrigerator trim, providing experience necessary to develop a good working knowledge of techniques for handling the alloy.

Sure Market—San Manuel Copper Corp. has a government guarantee of a market for 365,000 tons of electrolytic copper and 16,060 tons of molybdenum in concentrates from its holdings in Pinal County, Ariz. Price for the copper, Defense Materials Procurement Agency says, is guaranteed at 24¢ per lb, half a cent below present ceilings, while the molybdenum guarantee is at 60¢ per lb. If the company is unable to sell its output for the guaranteed price or more, DMPA is committed to buy it. The San Manuel holdings are described as one of the largest copper deposits ever discovered there.

MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in Aug. based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	24.50
Lake copper, delivered	24.625
Straits tin, New York	$1.2129
Zinc, East St. Louis	14.048
Zinc, New York	14.878
Lead, St. Louis	15.80
Lead, New York	16.00

NONFERROUS METAL PRICES

	Aug. 27	Aug. 28	Aug. 29	Aug. 30	Sept. 1	Sept. 2
Copper, electro, Conn	24.50	24.50	24.50	24.50	....	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	.....	24.625
Tin, Straits, New York	$1.21¼	$1.21¼	$1.21¼	.....	.....	$1.21¼*
Zinc, East St. Louis	14.00	14.00	14.00	14.00	....	14.00
Lead, St. Louis	15.80	15.80	15.80	15.80	....	15.80

Note: Quotations are going prices.
*Tentative.

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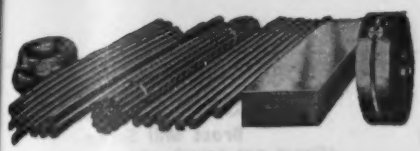
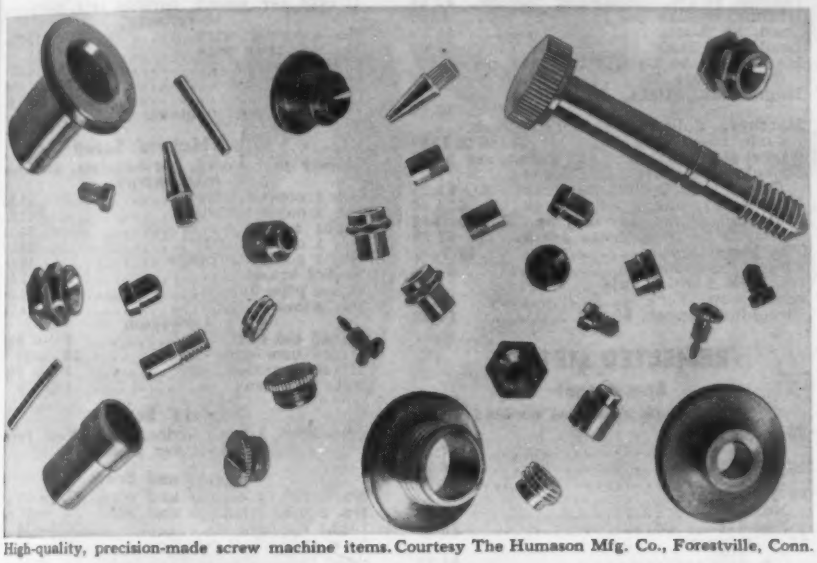


BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

"Bridgeport" BRASS CO. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



High-quality, precision-made screw machine items. Courtesy The Humason Mfg. Co., Forestville, Conn.

Building up a Reputation for Quality Screw Machine Items

Why are some screw machine shops consistently busy at all times while others depend upon peak periods of industrial activity for their very existence? The answer as to what makes a successful shop tick may well be strict quality control backed up by dependable service.

How can a screw machine shop obtain the needed quality-plus service for successful operation?

Most screw machine items are made on a contract basis to customers' specifications. Since they are intended to go into some special assemblies, they must be uniformly accurate and close in tolerances otherwise they can easily give endless trouble. The smaller the item, the more need for exactness.

Every screw machine operator knows that consistent quality demands good equipment and tools. Machines must be put into tiptop condition and maintained that way. He is aware that tools must be given careful attention for proper grinding and sharpness. For long runs, and heavy removal of stock, he must go to carbide tools for highest efficiency.

Good Labor Relations Essential

Management can achieve the objective of quality and service so necessary for the business success of a screw machine shop whose operation calls for skilled workers that are dependable and self-sufficient. A good operator uses his own judgment as to the state of his tools and accuracy of his production. Close watch and frequent periodic gauging of his production are absolutely essential.

The development of a high-type operator takes long, patient years as well as a considerable investment in money. Good management, therefore, makes every effort to establish good labor relations which will result in the minimum of labor turnover. To achieve this, the management gives the worker pleasant surroundings and considerate treatment. Naturally, he must receive steady employment and suitable compensation for his efforts. High quality and good service are premiums which are in great demand by users of metal products, and repeat orders as well as new business results.

Alloy Selection Important

The choice of metal or alloy rod is important especially for the manufacture of difficult items or those that must stand severe usage. Management must have an open mind and be willing to look into and try out different alloys and tempers.

Copper-base alloys for screw machine operation are numerous and varied. For most jobs Ledrite 6 Standard, free cutting brass rod (approximately 61% copper, 3.4% lead, remainder zinc) is highly satisfactory. It is exceptionally free machining and gives off fine chips. Its composition is uniform and dimensions are accurate. Tool wear is minimized. Yet, under certain conditions where deep knurling or cold-working is necessary, Ledrite 6 made with a softer temper may be more suitable. Or an alloy with less lead such as Ledrite 2 Medium Leaded (approximately 63% copper, 1.8% lead, remainder zinc) should be used.

An inquiry as to the customer's application of the screw machine part may lead to the recommendation of a superior metal. For example, if good corrosion resistance is called for, Leaded Commercial Bronze 89 (approximately 89% copper, 1.75% lead, remainder zinc) should be considered. It resists dezincification from corrosive well waters. It has a rich bronze color and a machinability rating of 80% as compared to Ledrite 6 which has a 100% rating.

Naval brass 24 (approximately 60% copper, 0.65% tin, remainder zinc) is specified by the Navy for making marine hardware, screws, bolts and nuts. It has a machinability of 30%. Naval brass can also be supplied with 1.75% lead (Alloy No. 29) and as low as 0.6% lead (Alloy No. 28). The addition of lead does not affect its corrosion resistance but improves its machinability.

Where great strength, hardness and excellent corrosion resistance are needed, Duronze III Alloy 707 (approximately 91% copper, 7% aluminum, 2% silicon) should be considered. It has a machinability rating of 60% as compared to Ledrite 6. Duronze III can also be used for pump parts for corrosive waters and for the manufacture of valve stems.

Bridgeport metallurgical laboratory will be glad to assist manufacturers by helping them to select the alloys best suited for specific applications. (8700)

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 31.6¢; 4S, 61S-O, 33.6¢; 52S, 35.8¢; 24S-O, 24S-OAL, 34.5¢; 75S-O, 75S-OAL, 41.9¢; 0.081 in., 2S, 3S, 32.8¢; 4S, 61S-O, 35.2¢; 52S, 37.4¢; 24S-O, 24S-OAL, 35.8¢; 75S-O, 75S-OAL, 43.9¢; 0.032 in., 2S, 3S, 34.5¢; 4S, 61S-O, 39.0¢; 52S, 41.8¢; 24S-O, 24S-OAL, 43.8¢; 75S-O, 75S-OAL, 54.8¢.

Plate ¼ in. and Heavier: 2S-F, 3S-F, 29.7¢; 4S-F, 31.7¢; 53S-F, 33.4¢; 61S-O, 32.3¢; 24S-O, 24S-OAL, 34.9¢; 75S-O, 75S-OAL, 40.7¢.

Extruded Solid Shapes: Shape factors 1 to 5, 35.5¢ to 77.2¢; 12 to 14, 36.2¢ to 93.5¢; 24 to 26, 38.7¢ to $1.22; 36 to 38, 45.9¢ to $1.79.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 39.4¢ to 36.2¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 42.5¢ to 36.8¢.

Screw Machine Stock: Rounds, 11S-Ts, ⅛ to 11/32 in., 56.2¢ to 44.1¢; ⅜ to 1½ in., 43.6¢ to 41.0¢; 1 9/16 to 3 in., 40.4¢ to 37.8¢; 17S-Te, 1.6¢ per lb lower. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 41.5¢ to 30.5¢; 52S, 50.4 to 36.8¢; 56S, 53.6¢ to 44.1¢; 17S-T4, 56.7¢ to 39.4¢; 61S-T4, 50.9¢ to 38.9¢.

Extruded Tubing: Rounds, 63S-T5, OD in in.: 1¼ to 2, 38.9¢ to 56.7¢; 2 to 4, 35.2¢ to 47.8¢; 4 to 6, 35.7¢ to 43.6¢; 6 to 9, 36.2¢ to 45.7¢.

Roofing Sheet: Flat, 0.019 in. x 28 in., per sheet, 72 in., $1.199; 96 in., $1.598; 120 in., $1.997; 144 in., $2.395. 0.24 in. x 28 in., 72 in., $1.448; 96 in., $1.931; 120 in., $2.414; 144 in., $2.897. Coiled sheet: 0.019 in. x 28 in., 26.6¢ per lb: 0.024 in. x 28 in., 28.2 per lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ⅝ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ⅝ in. diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ⅛ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ⅞, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	52½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52	....	45.12
Copper, h-r	....	41.37	....
Copper, drawn	....	42.62	....
Low brass	42.34	42.03	....
Yellow brass	40.17	39.86	....
Red brass	43.10	42.79	....
Naval brass	44.72	38.78	40.04
Leaded brass	....	....	38.02
Com'l bronze	44.39	44.08	....
Mang. bronze	48.44	42.83	43.89
Phos. bronze	64.72	64.97	....
Munts metal	42.69	38.25	39.50
Ni silver, 10 pct	51.96	54.18	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	20.00
Aluminum pig	19.00
Antimony, American, Laredo, Tex.	39.00
Berryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.50
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$186 to $189
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	83.25
Tin, New York	$1.21¼
Titanium, sponge	$5.00
Zinc, East St. Louis	14.00
Zinc, New York	14.83
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	20.5
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy (0.60 copper max.)	20.8
ASX-679	20.5
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33⅜
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball, anodes	25½
Nickel, 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	53
Copper sulfate, 99.5 crystals, bbl.	13.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ¼¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20½
Yellow brass	19½	17½
Red brass	20½	19½
Comm. bronze	20½	19½
Mang. bronze	18½	17½
Brass rod ends	18½	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.38
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.38
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75

Aluminum

Mixed old cast	9 — 9¼
Mixed new clips	10 — 11
Mixed turnings, dry	9 — 9½
Pots and pans	8½— 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17 —17½
Light copper	15½—16
New type shell cuttings	15½—16
Auto radiators (unsweated)	14 —14¼
No. 1 composition	17½—18
No. 1 composition turnings	17 —17½
Unlined red car boxes	16½—17
Cocks and faucets	15 —15½
Mixed heavy yellow brass	11½—12
Old rolled brass	14½—15
Brass pipe	15½—16
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6 — 6½
Aluminum crankcases	7 — 7½
2S aluminum clippings	10 —10½
Old sheet and utensils	7 — 7½
Borings and turnings	5 — 6
Misc. cast aluminum	7 — 7½
Dural clips (24S)	7 — 7½

Zinc

New zinc clippings	3 — 3½
Old zinc	6 — 6½
Zinc routings	3¾— 4¼
Old die cast scrap	4¼— 5

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	20 —21
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	12½—13
Battery plates (dry)	7 — 7½
Batteries, acid free	4 — 5

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	100 —110
No. 1 pewter	70
No. 1 auto babbitt	55 —60
Mixed common babbitt	14½—14¾
Solder joints	19 —20
Siphon tops	60
Small foundry type	19 —19½
Monotype	15½—16
Lino. and stereotype	13½—14
Electrotype	12 —12½
Hand picked type shells	9¾—10
Lino. and stereo. dross	7
Electro. dross	6¼

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So Good → they're often forgotten

Nickel Alloyed Worms and Gears Still Serve after 30 Years of Operation

A nickel bronze gear, teamed with a nickel alloy steel worm, gives you gearing that actually improves with use.

Many years ago, after considerable laboratory and actual field tests of various compositions, The Cleveland Worm and Gear Company . . . specializing for the past 40 years in the production of speed reducers . . . standardized on nickel-tin bronze gears.

Today, many of their drive units which were produced in the early days, are still operating regularly with the original worms and gears . . . which means more than 30 years of useful service.

The reason for this long, trouble-free performance is not hard to find. For nickel improves the strength of standard bronzes and is particularly effective in raising elastic properties . . . increasing shock resistance as much as 25 to 50 percent.

Nickel-containing alloys may meet the exacting demands of your particular equipment or production problems. Write us, today, for counsel and data.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of nickel alloyed bronzes for many end uses in defense and defense supporting industries.

NICKEL-TIN BRONZE . . . containing approximately 1½% nickel, 10½% tin, a maximum of 0.25% lead, the balance copper . . . is produced by several foundries for gear requirements of The Cleveland Worm and Gear Company of Cleveland 4, Ohio.

This company also uses Type 2317 (3½% nickel) carburizing steel for worms of large size, and Type 4615 (nickel-molybdenum) carburizing steel for the smaller sizes. Both of these steels are especially easy to handle in heat treatment, and consistently provide the hard surface and tough core so essential to efficient, long-lasting operation. Moreover, they withstand reasonably rapid grinding on automatic thread grinders without surface cracking or spalling.

EMBLEM OF INCO SERVICE
TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Hear Doubts on Scrap's Bullishness

Ceilings still prevail on steelmaking, blast furnace grades but some questions raised on validity of market bullishness after strike . . . Need of heavily-loaded mills will be prop.

Almost without exception, ceiling prices on steelmaking and blast furnace grades are the rule in today's scrap market. But scrap men themselves are now questioning the confidence that led to such formidable firming of the scrap market after the steel strike. There are some doubt being expressed that such confidence is enough to maintain full strength of the market.

In Pittsburgh, some buyers and brokers believe the market may be in for a period of weakness in the next month or so. It was mentioned that "virtually all activity today is on the basis of old orders at ceiling prices placed before the steel strike."

Similar sentiments were echoed in Cleveland—although not by a majority vote. Some consumers expect ceilings to hold for a while. Others think increasing supplies of industrial scrap may weaken dealer openhearth scrap in October. The West Coast market showed marked tendencies of slipping.

In New York, a shade of weakness crept into cast and blast furnace markets. The same was true of borings and turnings in Chicago.

Need of heavily-loaded steel mills is expected to prop up steelmaking and turnings grades even though some market weakness may crop up this fall. Winter may see a resurgence of scrap strength.

Pittsburgh—What is the basis for apparent strength of the market? That question is being asked here this week as doubts are raised that there is any real foundation for the post-strike display of bullishness. Some buyers and brokers feel the market is in for a period of weakness in the next 30 days. They look for reduced springboards as the first reflection of consumer resistance to the present trend. It was admitted that virtually all activity today is on the basis of old orders at ceiling prices placed before the steel strike.

Chicago—Market is strong in steelmaking grades but is showing some tenderness in borings and turnings. These are still going at ceiling but dealers are not able to push all they might like to. Car situation is improving and availability is adequate if not all that might be desired.

Philadelphia—Scrap market in this area seems to be going along on an even keel. No one complains about shortages of either material or business. Dealers, however, have little scrap to work on as industrial scrap is still not coming out in heavy volume. The freight car shortage is still plaguing some. Weaker feeling in blast furnace grades was expected to evaporate as soon as a major consumer resumed acceptance of shipments on Sept. 2.

New York — Although the market here was steady in steelmaking grades, a shade of weakness was evident in cast and blast furnace grades. The turnings group managed to hold at ceiling prices. There was an increase in cast buying—but not, generally, at ceiling prices. A consumer came into the market for turnings but the order did not match its previous purchases.

Detroit—Scrap has started to flow with a revival of normal production. Market is still aggressive for all blast furnace and steelmaking grades but a rapid improvement in industrial scrap is easing the picture somewhat. Mill inventories which were down are still low but will start picking up as new industrial scrap reaches the mill. Ore situation does not look as serious as it did. Blast furnace grades are still strong however. Cast is holding its own at slightly below ceiling.

Cleveland — The market continues firm at ceiling prices on practically all grades. But differences of opinion are arising on ability of the market to continue strong. While some consumers think ceiling prices will hold for some time, others feel that increased availability of industrial scrap will contribute to a weakness in dealer openhearth grades in October. It was pointed out that scrap generators are now receiving the steel they need for more normal operation, bringing more industrial scrap into the market.

St. Louis—Shipments of scrap iron have tapered off. Peddlers in the rural areas are not coming up with the material as had been expected. However, mills' inventories are in good shape. There was no buying during the week. Flurry of the preceding week in cast iron grades has subsided.

Birmingham—The cast scrap market is in a state of confusion. Dealers and brokers say some foundries will pay base ceiling prices, while others will offer no more than $5 under ceiling on all grades DELIVERED. Heavy melting continues to move slowly because of big deliveries taken by mills immediately after the end of the strike.

Cincinnati—The market is absorbing everything in sight, and there is no evidence of weakness. Demand for good grades of cast has improved. Foundries are grabbing up low phos with enthusiasm. Railroad specialties are strong. Influx of industrial scrap in any quantity has not materialized. Outlook here is for continued strength.

Buffalo — Cast scrap joined other items selling at ceiling levels on new sales to one of the area's leading consumers. Sales of cupola at top levels erased a $2 dip from controlled prices of the previous week. Strength continued to pervade steelmaking grades as dealers shipped against ceiling price orders. Substantial increases are shown in mill stock piles.

Boston — The freight car shortage which hit this area a short time ago seems to have disappeared. Scrap is now moving in satisfactory volume. All steelmaking and blast furnace grades are at ceiling though turnings display a somewhat softer tone.

West Coast—All time record high mill inventories and resulting lack of orders for dealers dropped the price of steelmaking scrap in the San Francisco and Los Angeles area last week but the market stayed firm in the Northwest. No. 2 heavy melting dropped from $34 ceiling to $31 and machine shop turnings from $20 to $17.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Iron and Steel SCRAP PRICES (Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments.)

Switching Charge (Dollars per gross ton) →		$0.99	.75	.63	.65	.75	.75	.75	.51	.61	.65	.26	.76	.83	.65	.75	.70	1.34	.75	.50	.20	.61	.51	.20	.52	.47	.51	.51	.51	.85	.50	.78	.50	.43	.51	.33	.67	.86	.65	.82	.88	.88
Basing Points →		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Wellrton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minnequa	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
GRADES	OPS No.																																									
No. 1 bundles	1	$44.00							$44.00				$43.00					$42.50						$42.00					$41.00	$41.15	$40.00	$39.50	$39.00		$38.00	$37.00		$36.00				
No. 1 busheling	2	44.00							44.00				43.00					42.50						42.00					41.00	41.15	40.00	39.50	39.00		38.00	37.00		35.00				
No. 1 heavy melting	3	43.00							43.00				42.00					41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00		34.00				
No. 2 heavy melting	4	43.00							43.00				42.00					41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00		34.00				
No. 2 bundles	5	43.00							43.00				42.00					41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00		34.00				
Machine shop turnings	6	34.00							34.00				33.00					32.50						32.00					31.00	31.15	30.00	29.50	29.00		28.00	27.00		25.00				
Mixed borings and turnings	7	38.00							38.00				37.00					36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00		29.00				
Shoveling turnings	8	38.00							38.00				37.00					36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00		29.00				
Cast iron borings	10	38.00							38.00				37.00					36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00		29.00				
No. 1 chemical borings	26	41.00							41.00				40.00					39.50						39.00					38.00	38.15	37.00	36.50	36.00		35.00	34.00		32.00				
Forge crops	11	51.50							51.50				50.50					50.00						49.50					48.50	48.65	47.50	47.00	46.50		45.50	44.50		42.50				
Bar crops and plate	12	49.00							49.00				48.00					47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00		40.00				
Punchings and plate	14	46.50							46.50				45.50					45.00						44.50					43.50	43.65	42.50	42.00	41.50		40.50	39.50		37.50				
Electric furnace bundles	15	46.00							46.00				45.00					44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00		37.00				
Cut const., plate, 3 ft and less	16	47.00							47.00				46.00					45.50						45.00					44.00	44.15	43.00	42.50	42.00		41.00	40.00		38.00				
Cut struc., plate, 2 ft and less	17	49.00							49.00				48.00					47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00		40.00				
Cut struc., 1 ft and less	18	50.00							50.00				49.00					48.50						48.00					47.00	47.15	46.00	45.50	45.00		44.00	43.00		41.00				
Foundry steel, 2 ft and less	20	44.00							44.00				43.00					42.50						42.00					41.00	41.15	40.00	39.50	39.00		38.00	37.00		35.00				
Foundry steel, 1 ft and less	21	46.00							46.00				45.00					44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00		37.00				
Heavy trimmings	24	43.00							43.00				42.00					41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00		34.00				
No. 1 RR heavy melting	RR 1	46.00							46.00				45.00					44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00		37.00				
Scrap rails, random lengths	RR 14	48.00							48.00				47.00					46.50						46.00					45.00	45.15	44.00	43.50	43.00		42.00	41.00		39.00				
Scrap rails, 3 ft and less	RR 16	51.00							51.00				50.00					49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00		42.00				
Scrap rails, 2 ft and less	RR 17	52.00							52.00				51.00					50.50						50.00					49.00	49.15	48.00	47.50	47.00		46.00	45.00		43.00				
Scrap rails, 18 in. and less	RR 18	54.00							54.00				53.00					52.50						52.00					51.00	51.15	50.00	49.50	49.00		48.00	47.00		45.00				
Rerolling rails	RR 15	53.00							53.00				52.00					51.50						51.00					50.00	50.15	49.00	48.50	48.00		47.00	46.00		44.00				
Uncut tires	RR 20	48.00							48.00				47.00					46.50						46.00					45.00	45.15	44.00	43.50	43.00		42.00	41.00		39.00				
Cut tires	RR 21	51.00							51.00				50.00					49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00		42.00				
Cut bolsters and side frames	RR 23	49.00							49.00				48.00					47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00		40.00				
RR specialties	RR 24, 28, 29	51.00							51.00				50.00					49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00		42.00				
Solid steel axles	RR 25	58.00							58.00				57.00					56.50						56.00					55.00	55.15	54.00	53.50	53.00		52.00	51.00		49.00				
No. 3 steel wheels	RR 27	51.00							51.00				50.00					49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00		42.00				
Unassorted	RR 35	40.00							40.00				39.00					38.50						38.00					37.00	37.15	36.00	35.50	35.00		34.00	33.00		31.00				

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

Under Ceiling Scrap Prices

Pittsburgh

Machine shop turn.	$32.00
Mixed bor. and ma. turns.	32.00
Cast iron borings	$35.00 to 35.50
No. 1 machinery cast	52.00
Heavy breakable cast	45.00
Malleable	55.00

Chicago

Low phos. forge crops	$50.00 to $51.00
Low phos. 3 ft and under	44.00 to 45.00
No. 1 machinery cast	47.50 to 48.50
Cupola cast	45.00 to 46.00
Heavy breakable cast	40.50 to 41.50
Malleable	53.00 to 55.00
Stove plate	42.00 to 43.00

Philadelphia Area

Clean cast chem. borings	$36.50 to $37.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	45.00 to 46.00
Unstripped motor blocks	41.00 to 42.00
Charging box cast	45.00 to 46.00

Cleveland

Cast iron borings	$34.00 to $34.50
Stove plate	45.00 to 46.00
Malleable	54.00 to 55.00

Youngstown

Cast iron borings	$35.00 to $35.50

Buffalo

No. 1 machinery cast	$49.00 to $51.00
No. 1 cupola cast	47.00 to 49.00

Birmingham

Shoveling turnings	$29.00 to $31.00
Cast iron borings	29.00 to 31.00
No. 1 cupola cast	44.00 to 45.00
Stove plate	40.00 to 41.00
Charging box cast	39.00 to 40.00
Heavy breakable	37.00 to 38.00
Drop broken machinery	44.00 to 45.00
Unstripped motor blocks	37.00 to 38.00

St. Louis

Unstripped motor blocks	$38.00

New York

Brokers' Buying prices per gross ton, on cars:

Clean cast chem. borings	$30.00 to $30.50
No. 1 machinery cast	48.00 to 50.00
Mixed yard cast	43.00 to 44.00
Charging box cast	42.00 to 43.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	37.00

Boston

Brokers' Buying prices per gross ton, on cars:

Mixed cupola cast	$39.00 to $40.00
Heavy breakable cast	39.00 to 40.00
Stove plate	38.00 to 39.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 cupola cast	$48.00
Heavy breakable cast	$43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron brake shoes	39.00 to 40.00

Cincinnati

Drop broken cast	51.00 to 52.00

San Francisco

No. 2 heavy melting	$31.00
No. 2 bundles	29.00
Machine shop turn	17.00
No. 1 cupola cast	46.00

Los Angeles

No. 2 heavy melting	$31.00
No. 2 bundles	29.00
Machine shop turn	17.00
No. 1 cupola cast	50.00

Seattle

No. 2 bundles	$29.00
No. 1 cupola cast	40.50
Heavy breakable	35.50

Hamilton, Ont.

No. 1 hvy. melting	$35.50
No. 1 bundles	35.50
No. 2 bundles	35.00
Mechanical bundles	33.50
Mixed steel scrap	31.50
Mixed bor. and turn.	32.50
Rails, remelting	35.50
Rails, rerolling	44.50
Bushelings	30.50
Bush. new fact. prep'd.	33.50
Bush., new fact. unprep'd	32.50
Short steel turnings	32.50
Cast scrap	50.00

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Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 2 1952	Aug. 28 1952	Aug. 5* 1952	Sept. 4 1951
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.775¢	3.775¢	3.775¢	3.60¢
Cold-rolled sheets	4.575	4.575	4.575	4.35
Galvanized sheets (10 ga)	5.075	5.075	5.075	4.80
Hot-rolled strip	3.725	3.725	3.725	3.50
Cold-rolled strip	5.20	5.20	5.20	4.75
Plate	3.90	3.90	3.90	3.70
Plates wrought iron	9.00	9.00	9.00	7.85
Stains C-R strip (No. 302)	36.75†	36.75†	36.75†	36.75
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.70
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.40
Special coated mfg. ternes	7.75	7.75	7.75	7.50
Bars and Shapes: (per pound)				
Merchant bars	3.95¢	3.95¢	3.95¢	3.70¢
Cold finished bars	4.925	4.925	4.925	4.55
Alloy bars	4.675	4.675	4.675	4.30
Structural shapes	3.85	3.85	3.85	3.65
Stainless bars (No. 302)	31.50†	31.50†	31.50†	31.50
Wrought iron bars	10.05	10.05	10.05	9.50
Wire: (per pound)				
Bright wire	5.225¢	5.225¢	5.225¢	4.85¢
Rails: (per 100 lb)				
Heavy rails	$3.775	$3.775	$3.775	$3.60
Light rails	4.25	4.25	4.25	4.00
Semifinished Steel: (per net ton)				
Rerolling billets	$59.00	$59.00	$59.00	$56.00
Slabs rerolling	59.00	59.00	59.00	56.00
Forging billets	70.50	70.50	70.50	66.00
Alloy blooms, billets, slabs	76.00	76.00	76.00	70.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.325¢	4.325¢	4.325¢	4.10¢
Skelp	3.55	3.55	3.55	3.35

* Revised † Add 4.7 pct.

Composite: (per pound)				
Finished steel base price	4.376¢	4.376¢	4.376¢	4.131¢

	Sept. 2 1952	Aug. 26 1952	Aug. 5 1952	Sept. 4 1951
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$58.19	$58.19	$58.19	$57.77
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti	55.58	55.58	55.58	55.58
Foundry, Birmingham	48.88	48.88	48.88	48.88
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic, del'd Philadelphia	57.27	57.27	57.27	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	226.25	226.25	186.25	186.25

†The switching charges for delivery to foundries in the Chicago district is $1 per ton.

‡Average of U. S. prices quoted on Ferroalloy pages.

Composite: (per gross ton)				
Pig Iron	$52.77	$52.77	$52.77	$52.60
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$43.00*	$44.00*
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	42.50*
No. 1 steel, Chicago	41.50*	41.50*	41.50*	42.50*
No. bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos. Youngstown	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	49.00†	49.00†	46.75	49.00*
No. 1 cast, Philadelphia	47.50	46.00	45.50	49.00*
No. 1 cast, Chicago	45.50	45.50	44.50	49.00*

*Basing pt., less broker's fee. †Shipping pt., less broker's fee.

Composite: (per gross ton)				
No. 1 heavy melting scrap	$42.00	$42.00	$42.00	$43.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.21¼	$1.21⅜	$1.21½	$1.05
Zinc, East St. Louis	14.00	14.00	15.00	17.50
Lead, St. Louis	15.80	15.80	15.80	16.00
Aluminum, virgin ingot	20.00	20.00	20.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	39.00	39.00	39.00	42.00

Composite Price Notes

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Warehouse Notes

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb.

WARE HOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As Rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As Rolled	Alloy Bars: Cold-Drawn Annealed
Baltimore	$.20													
Birmingham	.15	5.80	6.65	7.70[1]	5.80		6.10	5.95	5.80	8.40				
Boston	.20	6.51	7.36	8.68	6.55		6.80	6.56	6.61	7.46		12.18		13.18
Buffalo	.20	5.80	6.65	8.46	6.21		6.30	6.08	5.90	7.48		12.07		13.07
Chicago	.20	5.83	6.68	8.05	5.83		6.02	5.95	5.91	6.92		10.65		12.65
Cincinnati	.15	6.13	6.72	8.52	6.21		6.47	6.42	6.13	7.16		12.07		13.07
Cleveland	.20	5.80	6.65	8.19	6.00		6.17	6.33	5.89	6.99		10.79		12.79
Detroit	.20	6.07	6.92	8.34	6.13		6.47	6.42	6.30	7.10		11.82		13.82
Houston	.20													
Indianapolis	del'd.													
Kansas City	.20													
Los Angeles	.20	6.58	8.45	9.75	6.74		6.71	6.64	6.57	8.64		12.65		14.69
Memphis	.10													
Milwaukee	.20	5.97	6.88	8.22	6.31		6.17	6.12	6.00	7.10		10.82		12.82
New Orleans	.15													
New York	.30	6.35	7.27	8.47	7.15		6.60	6.39	6.59	7.53		11.04		13.04
Norfolk	.20													
Philadelphia	.25	6.11	7.13	8.35	6.60		6.24	6.17	6.42	7.45		10.79		12.79
Pittsburgh	.20	5.80		8.45	5.97		6.12	5.95	5.83	6.90		10.65		12.65
Portland	.20													
Salt Lake City	.20													
San Francisco	.15	6.87	8.22	9.55	7.08		6.69	6.55	6.66	8.70		12.05		14.60
Seattle	.20													
St. Louis	.20	6.10	6.95	8.35	6.48		6.40	6.35	6.13	7.20		10.95		12.95
St. Paul	.15													

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Best way to support a home

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Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tin plate • hot rolled strip • hot rolled sheet • alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products

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IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem Pa.					76.00 *B3*			3.90 *B3*	5.80 *B3*				
	Buffalo, N. Y.			59.00 *B3*	70.50 *B3, R3*	76.00 *B3, R3*		4.675 *B3*	3.90 *B3*	5.80 *B3*	3.725 *B3, R3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Claymont Del.													
	Coatesville Pa.													
	Conshohocken Pa.				77.50 *A2*	83.00 *A2*					4.125 *A2*		5.90 *A2*	
	Harrisburg Pa.													
	Hartford Conn.													
	Johnstown Pa.			59.00 *B3*	70.50 *B3*	76.00 *B3*			3.90 *B3*	5.80 *B3*	3.725 *B3*			
	Newark N. J.													
	New Haven Conn.											5.60 *A5* 5.85 *D1*		
	Phoenixville Pa.								6.10 *P2*					
	Putnam Conn.													
	Sparrows Pt. Md.										3.725 *B3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Worcester Mass.													
	Trenton N. J.											6.45 *R4*		
MIDDLE WEST	Alton, Ill.										4.20 *L1*			
	Ashland, Ky.										3.725 *A7*			
	Canton-Massillon, Ohio				70.50 *R3*	76.00 *R3* 78.60 *T3*								
	Chicago, Ill.			59.00 *U1*	70.50 *U1, R3,W8*	76.00 *U1, R3,W8*		4.675 *U1*	3.85 *U1, W8*	5.80 *U1*	3.725 *A1, W8*	5.35 *A1*		
	Cleveland, Ohio				70.50 *R3*							5.10 *A5, J3*		7.45 *J3*
	Detroit, Mich.	56.00 *R5*	57.00 *R5*		73.50 *R5*	79.00 *R5*					4.025 *G3* 4.40 *M2*	5.30 *G3* 5.45 *M2* 5.60 *D1* 6.05 *D2*	6.30 *G3*	6.15 *G3*
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			59.00 *U1*	70.50 *U1*	76.00 *U1, Y1*		4.675 *I3*	3.85 *I3, U1*	5.80 *I3, U1* 6.30 *Y1*	3.725 *I3, U1, Y1*	5.35 *I3*	5.65 *I3, U1* 6.15 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											5.10 *A7*		
	Niles, Ohio Sharon, Pa.										4.225 *S1*	5.80 *S1*	5.65 *S1*	7.30 *S1*
	Pittsburgh, Pa.	54.00 *U1*	57.00 *U1*	59.00 *U1, J3*	70.50 *U1, J3*	76.00 *U1*	3.55 *U1* 3.65 *J3*	4.675 *U1*	3.85 *U1, J3*	5.80 *U1, J3*	3.725 *J3, A7* 4.225 *S7*	5.10 *J3, A7* 5.80 *B4, S7*		
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								4.10 *W3*		3.825 *W3*	5.10 *W3*	6.10 *W3*	7.95 *W3*
	Youngstown, Ohio					76.00 *Y1, C10*	3.55 *U1, R3*			6.30 *Y1*	3.725 *U1, Y1, R3*	5.10 *R3, Y1* 5.70 *C5* 5.00 *B4*	5.65 *R3, U1* 6.15 *Y1*	7.30 *R3* 7.80 *Y1*
WEST	Fontana, Cal.	81.00 *K1*	83.00 *K1*	78.00 *K1*	89.50 *K1*	95.00 *K1*			4.45 *K1*	6.40 *K1*	4.975 *K1*	6.75 *K1*	6.55 *K1*	
	Geneva, Utah				70.50 *C7*				3.85 *C7*	5.80 *C7*				
	Kansas City, Mo.								4.45 *S2*		4.325 *S2*			
	Los Angeles, Torrance, Cal.				89.50 *B2*	96.00 *B2*			4.45 *C7, B2*	6.35 *B2*	4.475 *C7, B2*		6.40 *B2*	
	Minnequa, Colo.								4.30 *C6*		4.775 *C6*			
	San Francisco, Niles, Pittsburg, Cal.				89.50 *B2*				4.40 *B2* 4.56 *P9*	6.30 *B2*	4.475 *C7, B2*		6.40 *B2*	
	Seattle, Wash.				89.50 *B2*				4.50 *B2*	6.40 *B2*	4.725 *B2*		6.65 *B2*	
SOUTH	Atlanta, Ga.										4.275 *A8*			
	Birmingham, Ala. Alabama City, Ala.			59.00 *T2*	70.50 *T2*				3.85 *T2, R3*	5.80 *T2*	3.725 *T2, R3*			
	Houston, Texas		65.00 *S2*		78.50 *S2*	84.00 *S2*			4.25 *S2*		4.125 *S2*			

STEEL PRICES

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SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
													Bethlehem, Pa.
3.775 *B3*	4.575 *B3*				5.675 *B3*	6.925 *B3*							Buffalo, N. Y.
										† Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb, deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb, add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb, add 65¢.			Claymont, Del.
													Coatesville, Pa.
4.175 *A2*					5.925 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.325 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
3.775 *B3*	4.575 *B3*	5.075 *B3*			5.675 *B3*	6.925 *B3*	7.775 *B3*		4.425 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.625 *A5*				Worcester, Mass.
									4.425 *R4*				Trenton, N. J.
									4.70 *L1*				Alton, Ill.
3.775 *A7*		5.075 *A7*	4.925 *A7*										Ashland, Ky.
		5.075 *R3*											Canton-Massillon, Ohio
3.775 *W8*					5.675 *U1*				4.325 *A5,R3*				Chicago, Ill.
3.775 *R3, J3*	4.575 *R3, J3*		4.925 *R3*		5.675 *R3, J3*	6.925 *R3, J3*			4.325 *A5*				Cleveland, Ohio
3.975 *G3*	4.775 *G3*				6.225 *G3*	7.475 *G3*							Detroit, Mich.
													Duluth, Minn.
3.775 *I3, U1, Y1*	4.575 *I3, U1, Y1*	5.075 *I3, U1*	4.925 *U1*	5.475 *U1*	5.675 *I3, U1* 6.175 *Y1*	6.925 *I3, U1* 7.425 *Y1*			4.325 *Y1*	$8.70 *U1, I3, Y1*	$7.40 *U1, I3*	6.10 *U1, Y1*	Gary, Ind. Harbor, Indiana
4.30 *G2*	5.275 *G2*	5.50 *G2*	5.625 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
		5.475 *C9*											Kokomo, Ind.
	4.575 *A7*		4.925 *A7*	5.475 *A7*									Middletown, Ohio
4.175 *S1*					5.675 *S1*								Niles, Ohio Sharon, Pa.
3.775 *U1, J3,A7*	4.575 *U1, J3,A7*	5.075 *U1*	4.925 *U1*		5.675 *U1, J3*	6.925 *U1, J3*	7.625 *U1*		4.325 *A5*	$8.70 *U1, J3*	$7.40 *U1, J3*	6.10 *U1*	Pittsburgh, Pa.
									4.525 *P7*				Portsmouth, Ohio
3.775 *W3, W5*	4.575 *W3, W5*	5.075 *W3, W5*		5.475 *W3, W5*	6.025 *W3*	7.275 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.35 *W5*	Weirton, Wheeling, Follansbee, W. Va.
3.775 *U1, R3, Y1*	4.575 *R3, Y1*	5.775 *R1*	4.925 *Y1*		5.675 *U1* 6.175 *Y1*	7.425 *Y1*		5.825 *R1*	4.325 *Y1*	$8.70 *R3*	$7.40 *R3*		Youngstown, Ohio
4.725 *K1*	5.525 *K1*				6.625 *K1*	7.875 *K1*			5.125 *K1*				Fontana, Cal.
3.875 *C7*													Geneva, Utah
													Kansas City, Mo.
4.475 *C7*		5.825 *C7*						5.575 *C7*	5.125 *C7,B2*				Los Angeles, Torrance, Cal.
									4.575 *C6*				Minnequa, Colo.
4.475 *C7*	5.525 *C7*	5.825 *C7*							4.975 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.775 *T2, R3*	4.575 *T2*	5.075 *T2, R3*			5.675 *T2*			4.925 *R3*	4.325 *T2, R3*	$8.80 *T2*	$7.50 *T2*		Birmingham, Ala. Alabama City, Ala.
									4.725 *S2*				Houston, Tex.

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'r's. Bright
EAST	Bethlehem, Pa.				4.675 *B3*	6.00 *B3*	5.925 *B3*					
	Buffalo, N. Y.	3.95 *B3,R3*	3.95 *B3,R3*	4.975 *B5*	4.65 *R3* 4.675 *B3*	6.00 *B3,B5*	5.925 *B3*	3.90 *B3*			5.95 *B3*	
	Claymont, Del.							4.35 *C4*		5.35 *C4*		
	Coatesville, Pa.							4.35 *L4*			5.75 *L4*	
	Conshohocken, Pa.							4.35 *A2*	4.95 *A2*		6.20 *A2*	
	Harrisburg, Pa.							6.50 *C3*	6.50 *C3*			
	Hartford, Conn.			5.475 *R3*		6.45 *R3*						
	Johnstown, Pa.	3.95 *B3*	3.95 *B3*		4.675 *B3*		5.925 *B3*	3.90 *B3*		5.25 *B3*	5.95 *B3*	5.225 *B3*
	Newark, N. J.			5.375 *W10*		6.35 *W10*						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.475 *W10*								
	Sparrows Point, Md.		3.95 *B3*					3.90 *B3*		5.25 *B3*	5.95 *B3*	5.325 *B3*
	Worcester, Mass.					6.35 *A5*						5.525 *A5*
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.45 *L1*
	Ashland, Ky.							3.90 *A7*				
	Canton-Massillon	3.95 *R3*		4.925 *R2,R3*	4.65 *R3* 4.72 *T5*	5.99 *T5* 6.00 *R2,R3*						
	Chicago, Ill.	3.95 *U,W8, R3*	3.95 *R3*	4.925 *A5,B5 W8,W10*	4.675 *U1,W8* 4.65 *R3*	6.00 *B5,L2, R3,W8,W10* 6.05 *A5*		3.90 *U1,W8*	4.95 *U1*	5.25 *U1*	5.95 *U1*	5.225 *A5, N4,R3* 5.325 *K2*
	Cleveland, Ohio	3.95 *R3*	3.95 *R3*	4.925 *A5,C13*		6.00 *C13* 6.05 *A5*	5.925 *R3*	3.90 *R3,J3*	4.95 *J3*		5.95 *R3,J3*	5.225 *A5, C13*
	Detroit, Mich.	4.10 *R5* 4.30 *G3*		5.075 *R5,P8* 5.175 *P3*	4.825 *R5* 5.025 *G3*	6.15 *R5,P8* 6.20 *P3*	6.675 *G3*	4.45 *G3*			6.90 *G3*	
	Duluth, Minn.											5.225 *A5*
	Gary Ind. Harbor, Indiana	3.95 *I3, U1, Y1*	3.95 *I3, U1, Y1*	4.925 *L2, M5,R3*	4.675 *I3, U1, Y1*	6.00 *L2, M5,R5*	5.925 *I3, U1,* 6.425 *Y1*	3.90 *I3, U1, Y1*	4.95 *I3*	5.25 *U1*	5.95 *I3, U1* 6.45 *Y1*	5.325 *M4*
	Granite City, Ill.							4.60 *G2*				
	Kokomo, Ind.											5.325 *C9*
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							4.15 *S1*		5.70 *S1*	5.95 *S1*	
	Pittsburgh, Pa.	3.95 *U1,J3*	3.95 *U1,J3*	4.925 *A5,J3, W10,R3,C8*	4.675 *U1,J3*	6.00 *W10,C8* 6.05 *A5*	5.925 *U1,J3*	3.90 *U1,J3*	4.95 *U1,J3*	5.25 *U1,J3*	5.95 *U1,J3*	5.225 *A5, J3*
	Portsmouth, Ohio											5.625 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.10 *W3*						3.90 *W5* 4.20 *W3*				
	Youngstown, Ohio	3.95 *U1, Y1, R3*	3.95 *U1, Y1, R3*	4.925 *Y1*	4.675 *U1,C10, Y1*	6.00 *C10, Y1*	5.925 *U1* 6.425 *Y1*	3.90 *U1, Y1, R3*			5.95 *R3* 6.45 *Y1*	5.225 *Y1*
WEST	Fontana, Cal.	4.65 *K1*	4.65 *K1*		5.725 *K1*		6.975 *K1*	4.50 *K1*		6.20 *K1*	6.55 *K1*	
	Geneva, Utah							3.90 *C7*			5.95 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.275 *S2*							5.825 *S2*
	Los Angeles, Torrance, Cal.	4.65 *C7,B2*	4.65 *C7,B2*	6.375 *R3*	5.725 *B2*		6.625 *B2*					6.175 *C7,B2*
	Minnequa, Colo.	4.40 *C6*	4.75 *C6*					4.70 *C6*				5.475 *C6*
	San Francisco, Niles, Pittsburg, Cal.	4.65 *C7,P9* 4.70 *B2*	4.65 *C7,P9* 4.70 *B2*				6.675 *B2*					6.175 *C6, C7*
	Seattle, Wash.	4.70 *B2*	4.70 *B2*				6.675 *B2*	4.80 *B2*			6.85 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.675 *A8*
	Birmingham, Ala. Alabama City, Ala.	3.95 *T2,R3*	3.95 *T2,R3*				5.925 *T2*	3.90 *T2 R3*			5.95 *T2*	5.225 *T2, R3*
	Houston, Tex.	4.35 *S2*	4.35 *S2*		5.075 *S2*			4.30 *S2*				5.625 *S2*

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Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa
B5 Bliss & Laughlin Inc., Harvey, Ill.

C1 California Cold Rolled Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Steel Corp., Oakland, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Steel Co., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	23.93	28.14	23.19	27.28
	2½	12	32.17	37.83	31.19	36.67
	3	12	35.78	42.11	34.69	40.82
	3½	11	44.72	52.65	43.36	51.05
	4	10	55.52	65.31	53.83	63.32
National Tube	2	13	22.81	27.94	22.23	.....
	2½	12	31.28	38.31	30.51	.....
	3	12	35.87	43.93	34.98	.....
	3½	11	42.56	52.12	.....	.....
	4	10	54.02	66.16	.....	.....
Pittsburgh Steel	2	13	.....	.....	.....	.....
	2½	12	.....	.....	.....	.....
	3	12	.....	.....	.....	.....
	3½	11	.....	.....	.....	.....
	4	10	.....	.....	.....	.....

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn. *S7*	.....	.....	.....	.....	.....
Carnegie, Pa. *S9*	.....	.....	.....	.....	.....
Cleveland *A5*	5.10	7.30	8.25	10.20	12.50
Detroit *D1*	6.45	7.50	8.10	.....	.....
New Castle, Pa. *B4*	5.80	7.65	8.25	10.20	.....
New Haven, Conn. *D1*	6.70	7.60	8.20	.....	.....
Sharon, Pa. *S1*	5.80	7.65	8.25	10.20	12.50
Trenton, N. J. *R4*	.....	7.95	8.55	10.50	12.80
Weirton, W. Va. *W3*	5.80	7.65	8.25	10.20	12.50
Worcester, Mass. *A5*	5.40	7.60	8.55	10.50	12.80
Youngstown *C5*	.....	7.65	8.25	10.20	12.50

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill. Add 4.7 pct

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets*: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*; (type 316 add 4.5¢) *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Lockport, N. Y., *R4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; (type 316 add 4.5¢); W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Lockport, N. Y., *S4*; Sharon, Pa., *S1* (type 301 add ¼¢); Butler, Pa., *A7*; Wallingford, Conn., *W1*.

Bars: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y. *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Lockport, N. Y., *S4*; Canton, O., *T5*; Ft. Wayne, *J4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*

Plates: Brackenridge, Pa., *A3* (type 416 add ½¢); Butler, Pa., *A7*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa. *C11*; New Castle, Ind., *I2*; Lockport, N. Y., *S4*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

PIPE AND TUBING

Base discounts f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½–3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt. *B3*	30.5	8.25	33.5	12.25	35.5	15.75	36.5	16.25	37.0	17.25	37.5	17.75	38.0	18.25	.....	.....	.....	.....	.....	.....
Youngstown *R3*	32.5	10.25	35.5	14.25	38.0	17.75	39.4	18.25	39.0	19.25	39.5	19.75	40.0	20.25	.....	.....	.....	.....	.....	.....
Fontana *K1*	21.0	+1.25	24.0	2.75	26.5	6.25	27.0	6.75	27.5	7.75	28.0	8.25	28.5	8.75	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75	24.0	2.25	27.0	5.75	29.0	7.75
Pittsburgh *N2*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
Alton, Ill. *L1*	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25	.....	.....	.....	.....	.....	.....
Sharon *M3*	32.5	9.25	35.5	13.25	38.0	16.25	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.25	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	.....	27.0	.....	29.0	.....
Wheeling *W5*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	.....	.....	.....	.....	.....	.....
Wheatland *W4*	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
Indiana Harbor *Y1*	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25	.....	.....	.....	.....	.....	.....
Lorain *N2*	32.5	15.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. *B3*	30.25	9.5	34.25	13.5	36.25	17.0	36.75	17.5	37.25	18.5	37.75	19.0	38.25	19.5	.....	.....	.....	.....	.....	.....
Youngstown *R3*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	.....	.....	.....	.....	.....	.....
Fontana *K1*	20.75	.....	24.75	.....	26.75	.....	27.25	.....	27.75	.....	28.25	.....	28.75	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0	23.75	2.0	27.75	6.5	31.25	10.0
Pittsburgh *N2*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	4.5	27.75	8.5	31.25	12.0
Alton, Ill. *L1*	29.25	8.5	33.25	12.5	35.25	16.0	35.75	16.5	36.25	17.5	36.75	18.0	37.25	18.5	.....	.....	.....	.....	.....	.....
Sharon *M3*	32.25	10.5	36.25	14.5	38.25	17.5	38.75	18.0	39.25	18.5	39.75	19.0	40.25	19.5	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	.....	27.75	.....	31.25	.....
Wheeling *W5*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	.....	.....	.....	.....	.....	.....
Wheatland *W4*	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	32.25	11.5	36.25	15.5	37.75	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	22.5	23.75	4.5	27.75	8.5	31.25	12.0
Indiana Harbor *Y1*	31.25	10.5	35.25	14.5	37.25	17.5	37.75	18.5	38.25	19.5	38.75	20.0	39.25	20.5	.....	.....	.....	.....	.....	.....
Lorain *N2*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	4.5	27.75	8.5	31.25	12.0

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ½ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct. St. Louis zinc price now 14.0¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.58
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	7.85	9.10	9.90	10.45	11.00	11.70
Brackenridge *A3*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Granite City *G2*	....	8.55	9.80	....	....	....	....
Ind. Harbor *I3*	7.35	7.85	9.10	....	....	....	....
Mansfield *E2*	....	....	....	....	....	....	....
Niles, O. *N3*	....	....	....	....	....	....	....
Vandergrift *U1*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Warren, O. *R3*	7.35	7.85	9.10	....	....	....	....
Zanesville *A7*	7.35	7.85	9.10	9.90	10.45	11.00	11.70

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery	Low Phos. Charcoal
Bethlehem *B3*	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham *R3*	48.38	48.88	.....	.....	.....	.....	.....
Birmingham *W9*	48.38	48.88	.....	.....	.....	.....	.....
Birmingham *S5*	48.38	48.88	.....	.....	.....	.....	.....
Buffalo *R3*	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo *H1*	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago *I4*	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland *A5*	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland *R3*	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex. *L3*	48.00	48.50	48.50	.....	.....	.....	.....
Duluth *I4*	52.00	52.50	52.50	53.00	.....	.....	.....
Erie *I4*	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass. *M6*	.....	59.75	60.25	.....	.....	.....	.....
Fontana *K1*	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah *U1, Y1*	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill. *K3*	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio *Y1*	52.00	52.50	52.50	.....	.....	.....	.....
Ironton Utah *C7*	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio *J1,G1*	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn. *T3*	.....	.....	.....	.....	.....	.....	66.00
Minnequa *C6*	54.00	55.00	55.00	.....	.....	.....	.....
Monessen *P6*	54.00	.....	.....	.....	.....	.....	.....
Neville Island *P4*	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh *U1*	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville *S3*	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton *B3*	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland *A2*	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo *I4*	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y. *R3*	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown *Y1*	52.00	52.50	52.50	53.00	.....	.....	.....
N. Tonawanda, N. Y. *T1*	.....	52.50	53.00	.....	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.5 0 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per net ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 overcomparable silvery iron.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails† Col	Woven Wire Fence 9–15½ ga. Col	Fence Posts Col	Single Loop Bale Ties Col	Twisted Barbless Wire Col	Galv. Barbed Wire Col	Merch. Wire Ass'd ¢/lb.	Merch. Wire Gal.* ¢/lb.
Alabama City *R3*	118	135	...	132	...	144	6.075	6.325
Aliquippa, Pa. *J3*	127	141	...	...	...	148	6.075	6.525
Atlanta *A8*	130	140	...	135	...	149	6.325	6.675
Bartonville *K2*	....	....	....	....	....	....	....	....
Buffalo *W6*	....	....	....	....	....	....	....	....
Cleveland *A6*	....	....	....	....	....	....	6.075	6.225
Cleveland *A5*	....	....	....	....	....	....	....	....
Crawfrdsvl. *M4*	....	....	....	....	....	....	....	....
Donora, Pa. *A5*	127	133	...	132	...	142	6.075	6.225
Duluth *A5*	127	133	...	132	...	142	6.075	6.225
Fairfield, Ala. *T2*	127	133	...	132	...	142	6.075	6.225
Houston *S2*	135	147	...	...	...	156	6.475	6.925
Johnstn., Pa. *B3*	127	...	148	...	149	...	...	6.575
Joliet, Ill. *A5*	127	133	...	132	...	142	6.075	6.225
Kokomo, Ind. *C9*	....	....	142	....	....	....	6.175	6.425
Los Angeles *B2*	....	....	....	....	....	....	7.025	....
Kansas City *S2*	139	....	....	144	....	160	6.675	7.125
Minnequa *C6*	123	146	138	137	....	153	6.325	6.70
Monessen *P6*	....	....	....	....	....	....	....	....
Moline, Ill. *R3*	....	....	136	....	....	....	....	....
Pittsburg, Cal. *C7*	146	156	...	156	162	162	7.025	7.125
Portsmouth *P7*	132	....	....	....	....	....	6.47	....
Rankin, Pa. *A5*	127	133	....	....	....	142	6.075	6.225
So. Chicago *R3*	118	135	140	132	....	144	6.075	6.325
S. San Fran. *C6*	....	....	....	156	....	167	7.025	7.40
Sparrows Pt. *B3*	129	....	....	134	151	....	....	6.675
Sterling, Ill. *N4*	127	138	...	132	147	...	6.075	6.45
Struthers, O. *Y1*	....	....	....	....	....	....	....	....
Torrance, Cal. *C7*	147	....	....	....	....	....	7.025	....
Worcester *A5*	133	....	....	....	....	....	6.375	6.525
Williamsport, Pa. *S10*	....	....	....	....	....	....	....	....

Cut Nails, carloads, base $7.80 per 100 lb. (less 20¢ to jobbers), at Conshohocken, Pa., (*A2*), Wheeling, W. Va., (*W5*), $7.80.

* Alabama City and So. Chicago don't include zinc extra.

† Alabama City, So. Chicago, and Minnequa, add 45¢ per 100 lb.

UNIVERSITY OF MICHIGAN LIBRARIES

—Miscellaneous Prices—

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pct Off List

	Less Keg. Reg.	K. Reg.	Less Keg. Hvy.	K. Hvy.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	8½	23	2	17½

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	29½
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thus ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

Pct Off List

Packaged, steel, plain finished. 48—10
Packaged, plate finish ..... 31—10
Bulk, plain finish** 62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

Base per 100 lb

½ in. & larger $7.85

Cap and Set Screws

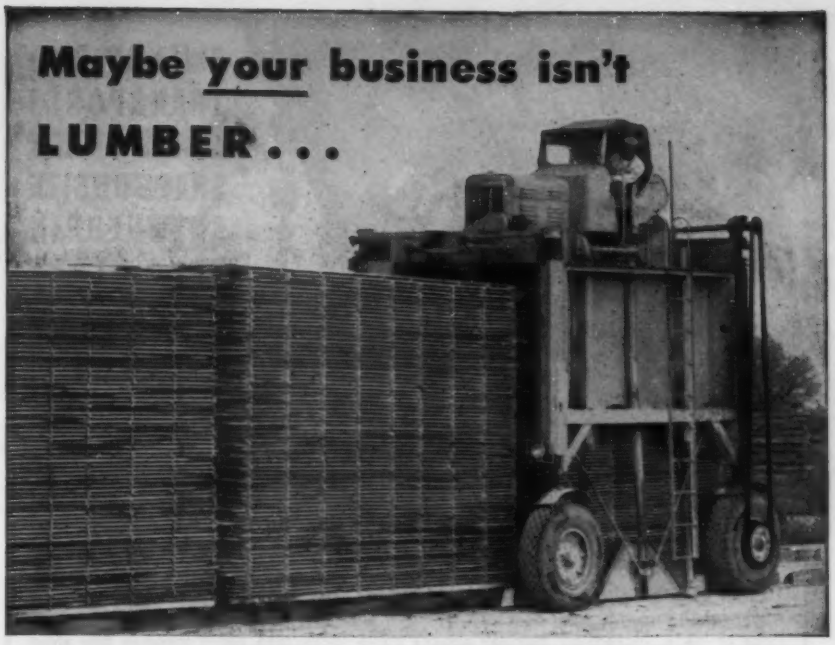
(In bulk) *Pct Off List*

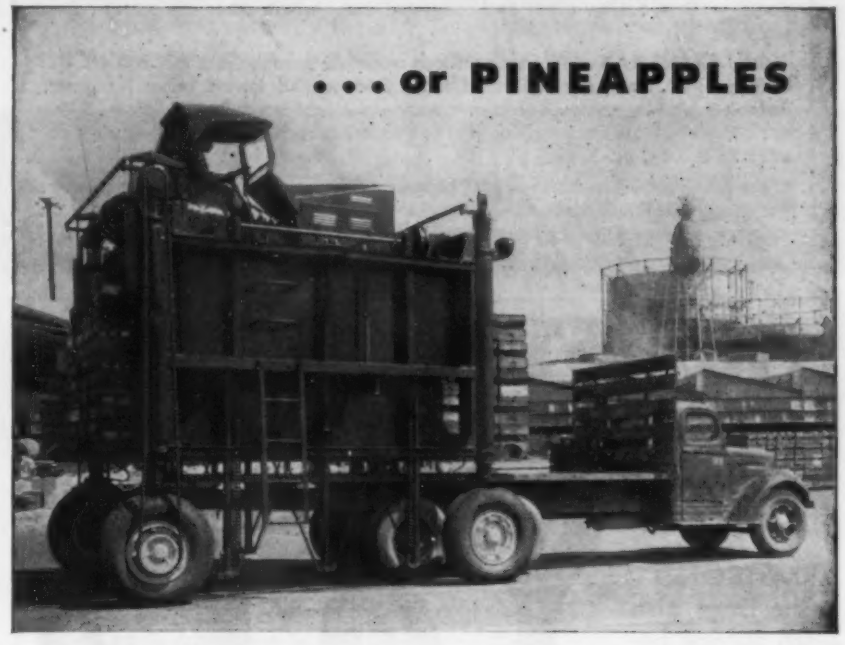
Hexagon head cap screws, coarse or fine thread, ¼ in thru ⅝ in. x 6 in., SAE 1020, bright	54
⅝ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
⅝ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....





BUT... just imagine the savings you could make, the problems you could solve by handling your materials with ROSS Straddle Carriers, the most flexible and most adaptable mass material handling method known!

ROSS engineers will be glad to work with your materials handling men in exploring the possibilities of ROSS Straddle Carriers for your operations . . . there's no obligation.

Send for details on ROSS Straddle Carriers . . . 10,000 lb., 20,000 lb., 35,000 and 45,000 lb. capacities.

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Direct Factory Branches and Distributors throughout the world.

425 Miller St., Benton Harbor, Michigan, USA

COMPACT, FAST TRAVELING

KRANE KAR

SWING-BOOM MOBILE CRANE

CAN SWING IT!

SWINGS AND TRANSPORTS LOADS OF ANY SHAPE OR SIZE ANYWHERE IN YOUR PLANT

1½, 2½, 5 and 10 ton cap.

You don't have to face the load . . . swing the boom! It's live and handles up to 10 tons at either side. You can swing materials from a RR car right onto a waiting truck; reach into a boxcar and load it; stack piles two-deep and three-deep on both sides of aisle, increasing storage space; move loads into plant through low shop doors; work in narrow aisles and congested areas where other equipment cannot operate.

Only **KRANE KAR** can do such difficult materials-handling jobs ECONOMICALLY because 1—it transports full rated load; 2—tops and lowers boom by power; 3—lowers load by power; 4—has automatic crane braking at limit positions; 5—has good vision; 6—excellent traction and short turning radius; 7—gas-powered, it can work 24 hours a day.

Use **KRANE KAR** as a standby for bigger cranes and for emergency maintenance and repairs. *ASK FOR BULL. 89—STEEL, Metalworking and Metalproducing Industries.*

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

ARMSTRONG *Drop Forged*

LATHE DOGS

ARMSTRONG Lathe Dogs give extra service because they are drop forged from selected open hearth steel, and are heat treated to extreme toughness and stiffness. Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. ARMSTRONG Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local ARMSTRONG Distributor.

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5209 West Armstrong Ave., Chicago 30, Ill.

New York and San Francisco

—Miscellaneous Prices—

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	3.775	4.25	4.925				
Chicago *R3*				6.65			
Cleveland *R3*							
Ensley *T2*	3.775	4.25					
Fairfield *T2*		4.25		6.65		4.775	
Gary *U1*	3.775	4.25				4.775	
Ind. Harbor *I3*	3.775		4.925	6.65		4.775	
Johnstown *B3*		4.25					
Joliet *U1*		4.25	4.925				
Kansas City *S2*							
Lackawanna *B3*	3.775	4.25	4.925			4.775	
Lebanon *B3*				6.65			
Minnequa *C6*	3.775	4.75	4.925	6.65		4.775	9.85
Pittsburgh *R3*							
Pittsburgh *O1*							
Pittsburgh *P5*							
Pittsburgh *J3*							
Pitt'g., Cal. *C7*						4.925	
Seattle *B2*						4.925	
Steelton *B3*	3.775		4.925			4.775	
Struthers *Y1*							
Torrance *C7*						4.925	
Youngstown *R3*				6.65			

TOOL STEEL

F.o.b. mill
Add 4.7 pct

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Add 4.7 pct

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*28.00	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I2*	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. *A4*		77.00
Iuminized steel sheets, hot dip, Butler, Pa. *A7*		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.57
14	60, 72	8.84
10, 12	60	9.10
8	60	

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:
70% or more $42.00
60% or less 40.00

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—Miscellaneous Prices—

REFRACTORIES

Fire Clay Brick *Carloads, per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite *St. ¾-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$62.70
Domestic, f.o.b. Chewalah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ . . . $13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. 1952 prices not yet established. 1951 prices were:

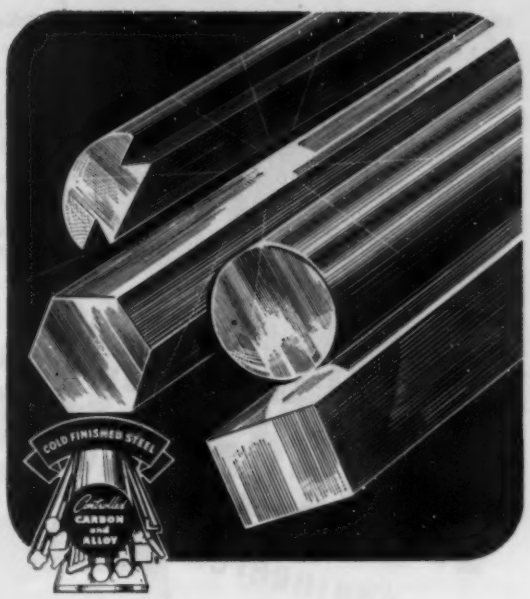
	Gross Ton
Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in Lake vessel rates, upper Lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	10.9¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe.	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe.	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.75¢ plus metal value
copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢



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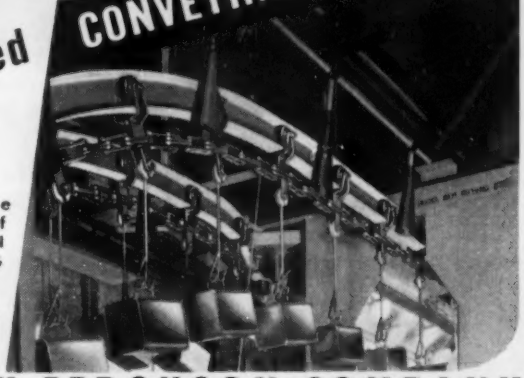

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Tie faster, tighter, safer with one machine and Gerrard Steel Strapping

MODEL G MACHINE

A single Gerrard machine (there are several sizes to fit a variety of jobs) tensions, ties and cuts Gerrard Steel Strapping quickly. It leaves a strong, tight, securely tied, steel strap around box, carton, crate and pallet, whether rectangular, circular or odd in shape. Gerrard Strapping complies fully with Army-Navy specifications JAN-P-106A, JAN-P-107 and JAN-P-108 for overseas packing.

Call a Gerrard engineer for the full story about the Gerrard Method of Strapping. The full story includes the reasons why Gerrard Round Steel Strapping costs about 40% less than any other metal reinforcement, and recommendations for the correct machine and size of strapping to do your tying job best.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL COMPANY

4705 South Richmond St., Chicago 32, Ill.

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U·S·S GERRARD ROUND STEEL STRAPPING

UNITED STATES STEEL

—Ferroalloy Prices—

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			32.00
62-66% Cr, 4-6% C, 6-9% Si			32.00

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	31.60
Ton lots	33.75
Less ton lots	35.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.14
0.50% max. C	1.10
9 to 11% C	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O.	$225
F.o.b. Johnstown, Pa.	$227
F.o.b. Sheridan, Pa.	$226
F.o.b. Etna, Clairton, Pa.	$228

Add $2.80 for each 1% above 82% Mn, subtract $2.80 for each 1% below 78% Mn.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	12.45
Ton lots, packed	14.00

UNIVERSITY OF MICHIGAN LIBRARIES

WHAT'S THE BEST WAY TO STRIP PAINT FROM METAL PARTS TOO LARGE TO BE SOAKED IN TANKS?

See Page 3

Oakite's New FREE Booklet on Paint Stripping

answers many questions that will lead you to better stripping procedures. You'll want to read more about:

What's the best way to strip large areas of structural metal where a steam supply is available? *See page 5.*

What is the best method when steam is not available? *See page 7.*

What is the cheapest way to strip metal parts in large volume? *See page 9.*

What are the best ways to prepare stripped surfaces for repainting? *See page 11.*

What strippers are best for removing oil-base paints? . . . Synthetic enamels, alkali-resistant plastics or resin-based paints? . . . Japans, wrinkle finishes, nitrocellulose lacquers, alkyds, phenolics and ureas? *See page 12.*

FREE For a copy of "How to STRIP PAINT" write to Oakite Products, Inc., 30H Thames St., New York 6, N. Y.

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—Ferroalloy Prices—

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$84.00	$85.00
Pgh. or Chicago	84.00	85.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
Less ton lots	34.00 to 37.00

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	28.45	30.30	31.50
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet, contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Recovered 3 TIMES Its Cost In 2 YEARS Use . . .

No Repairs or Replacements*

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Material handled overhead saves valuable floor space for production.

The Titan is a powerful, little hoist with big hoist features: Improved Worm Drive, Electric Brake, Steel Wire Hoisting Rope, Push-Button Control. Capacities: 250 lbs. to 1 ton; with monorail trolley or upper hook suspension.

Write for Titan Bulletin 801A; also Bulletin 695 on light, overhead Electric Hoist Cranes.

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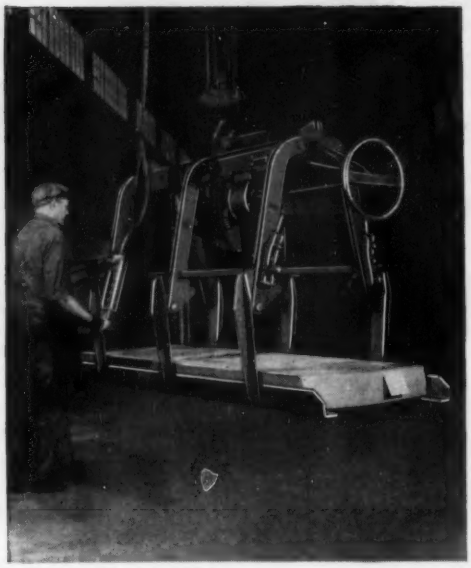
"ESTABLISHED 1914"

LANSING 2 MICHIGAN

EASY SHEET HANDLING *with a* C-F LIFTER



This is the easy way to move sheet steel. One man and this C-F Lifter can handle many tons of sheets per day with ease, speed and economy.

C-F Lifters have infinite opening and closing adjustments of the jaws permitting them to handle many varying sheet widths. These adjustments are made by the operator in a few seconds.

If your production involves the use of sheet steel, a C-F Lifter will save you many times its cost in the handling speed and economies it will effect.

Write for the bulletin "C-F Lifters." It illustrates the many advantages of these material handling tools.

C-F Lifters are made in sizes to handle 2 to 60 tons in standard and semi-special designs.

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The **Iron Age**
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Ferroalloy Prices

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carloads ..... $.50
Ton lots 11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60% 2 in. x D, contract basis, delivered per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload $75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagra Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W5, ton lots, delivered $5.00

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B ..... .85
14 to 19% B 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.46
Less ton lots 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered
Less ton lots $1.80

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

UNIVERSITY OF MICHIGAN LIBRARIES